A CULTURAL RESOURCES LITERATURE SEARCH AND RECORD REVIEW OF THE ST. FRANCIS RIVER SEEPAGE PROJECT WITHIN CLAY, CRAIGHEAD, MISSISSIPPI AND POINSETT COUNTIES, ARKANSAS, AND DUNKLIN COUNTY, MISSOURI

by

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and

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A Cultural Resources Literature Search was conducted in the St. Francis River Seepage Project by Mid-Continental Research Assoc. for the Memphis District, Army Corps of Engineers. The project area involved covers a 1000 ft. wide corridor along the St. Francis River between Campbell, MO and Marked Tree,AR and along the Right Hand Chute of Little River from the Missouri border southto near Marked Tree.

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ABSTRACT

A cultural resources literature search was conducted in the St. Francis River Seepage Project by Mid-Continental Research Associates for the Memphis District, Army Corps of Engineers (COE). The project area involved covers a 1000 foot wide corridor along the St. Francis River between Campbell, Missouri and Marked Tree, in northeast Arkansas, and along the Right Hand Chute of Little River from the Missouri border south to near Marked Tree. The purpose of the project is to furnish the COE with data on the known extent and location of archeological sites and to develop a predictive statement of site locations to aid in the project planning as required by laws and regulations. Search of the State site Files in Arkansas and Missouri resulted in the identification of 30 known sites in the project area. Analysis of the soils variables suggest that approximately 334 additional archeological sites are present in the project area. Previous investigations at sites along the river and certain research problems which are unique to this basin within the Lower Mississippi River Valley suggest that a large proportion of these are likely to be significant in terms of the National Register of Historic Places Criteria.

TABLE OF CONTENTS

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

CHAPTER 1

INTRODUCTION

by

Robert H. Lafferty III

A cultural resources literature search of the St. Francis River Seepage Project Area was carried out by Mid-Continental Research Associates (MCRA) for the Memphis District, Corps of Engineers (COE). The purpose of the project was to review the cultural and historical literature and state records to determine the known data base and to develop predictive statements about the distribution of the resources so that surveys can be intelligently planned. This will keep the COE in compliance with the Federal laws and regulations designed to protect these fragile and often subtle resources.

Important laws and regulations governing these tasks include: National Historic Preservation Act of 1966 (P. L. 89-665); The National Environment Policy Act of 1969; Executive Order 11593, "Protection and Enhancement of the Cultural Environment," (Federal Register 1971:3921); Preservation of Historic and Archeological Data, 1974 (P.L. 93-291); and the President's Advisory Council on Historic Preservation's "Proceedures for the Protection of Historic and Cultural Properties (36 CFR 8, Part 800 [Federal Register 1976). These laws and regulations have been operationalized in Arkansas (Davis 1982) and Missouri (Weichman 1978a, 1978b) and mandate that archeological and historic properties be identified and tested before any project using federal funds are consumated and if significant properties are identified that a plan be developed to mitigate the project impacts. This report presents the activities carried out in the initial literature search, details the known extant of the data base, and makes recommendations to efficiently identify all of the significant resources.

PROJECT LOCATION

The St. Francis River Seepage Project is located in two distinct areas. One is on the sides of the St. Francis River between Marked Tree, Arkansas and Cambell, Missouri. The other is on the west bank of the Right Hand Chute of Little River (RHCLR) between the Arkansas/Missouri state line and Marked Tree (Figure 1). At the upstream end the St. Francis has cut through Crowley's Ridge at Chalk Bluff joining the Western and Eastern Lowlands of the Mississippi River. This has resulted in a slow rate of inci-

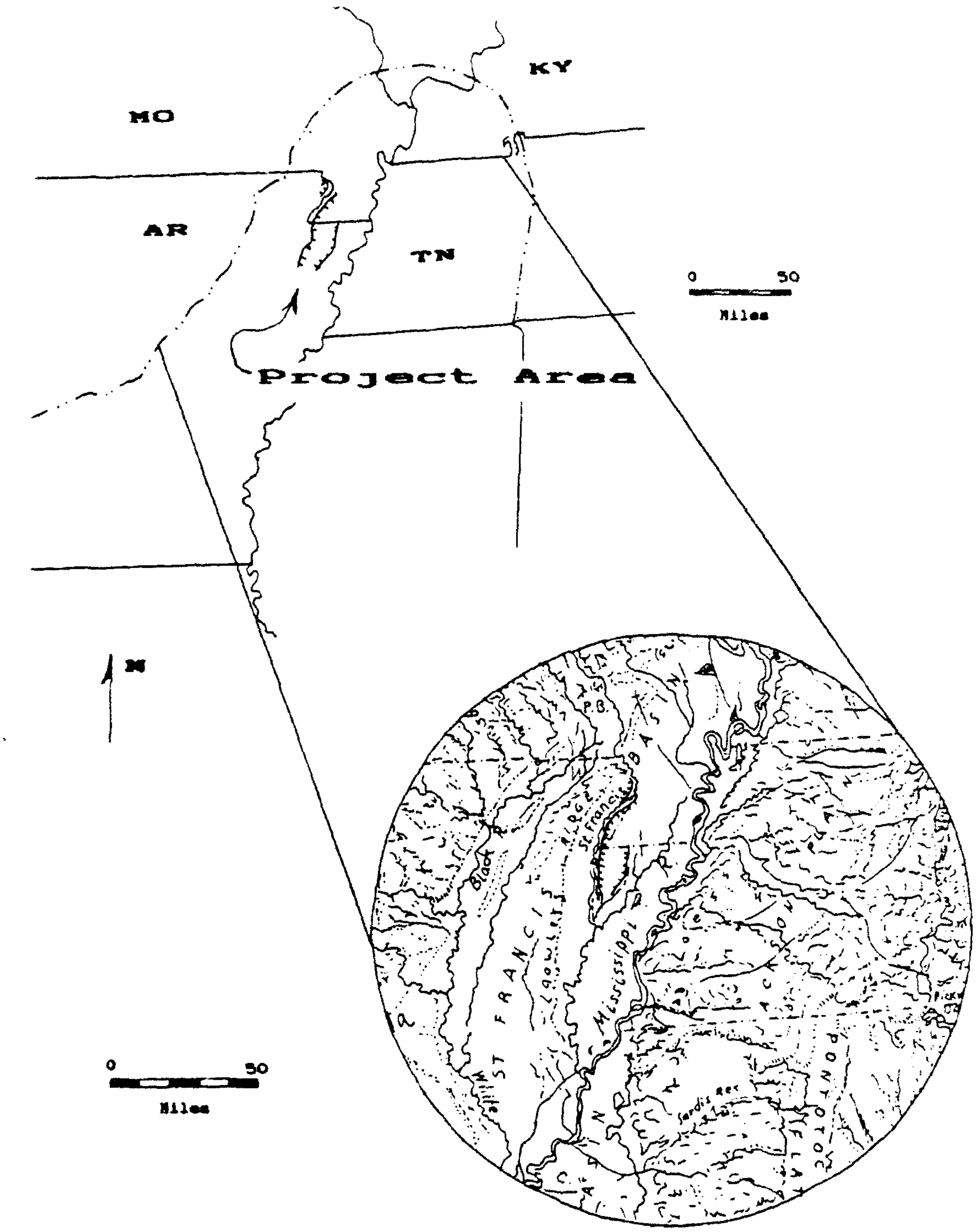


Figure 1. Project area location

sion and deposition, which have important implications for the nature of the archeological resources (Chapter 2). Crowley's ridge has been an important land transportation route for access to the Central Mississippi Valley (Lafferty et al 1985; Dekin et al 1978), and is an important source of lithics for the adjacent lowlands. The St. Francis River Gap, on the other hand was one of only three places where river channels have cut Crowley's Ridge (The closest is the Castor ca. 30 miles to the north, and the other is the L'Anguille River at the south end of the ridge). These and other related factors make the project area a very important transportation juncture with cultural and ecological borders being present at different times (Chapters 2 and 3). The unique lithic resource availability makes this location _a priori_ important to the whole region (Chapters 2 and 3).

PROJECT HISTORY

The Purchase Order was issued on 15 July 1985 and received on 25 July 1985.

The Records Review was conducted between 10 August and 10 September 1985 by Mr. Donald S. Warden and Ms. Kathleen M. Hess. Records at the Missouri Archeological Survey and the Office of the Arkansas State Archeologist were consulted to determine the state of knowledge in the region. The Draft Report was submitted to the Corps of Engineers on 30 September for review. Review comments were received on 26 October. Revisions were made and the Final Report was submitted on 30 October 1985.

CHAPTER 2

ENVIRONMENT

by

Robert H. Lafferty III

The environment of the St. Francis River Seepage Project is one of the most unusual depositional environments the author has ever encountered. This is because the headwaters of the St. Francis River are located above the western lowlands of the Mississippi River which is nearly as low laying as the discharge point in the Mississippi River (Figure 2). Before cutting Crowley's Ridge the larger sediments (i.e., sand) are deposited in the Western Lowlands. This makes the sediments available for deposition particularly fine grained in the St. Francis Gap. Moreover, the major source area for sediments -- the Western Lowlands -- are composed of fine sediments making the current depositional regime very fine grained.

PHYSIOGRAPHIC ENVIRONMENT

The St. Francis River Seepage project area is located below the St. Francis River Gap which is incised into Crowley's Ridge. The gap joins the Western and Eastern Lowland physiographic region which is part of the Central Mississippi River Valley (Figure 2; Morse and Morse 1983). This portion of the Mississippian Embayment is a deeply incised canyon, which has alluviated since the beginning of the Holocene. The Mississippi valley is 80 miles wide at the project area and is divided roughly in half by Crowley's Ridge (Medford 1972:69). The St. Francis Gap is 1-2 miles wide and cuts 15 miles through Crowley's Ridge. The St. Francis River has its headwaters in the St Francis Mountains 45 miles to the northwest.

The Mississippi River has formed the structure of the environment first by carving this great valley and more recently, by depositing nearly a mile of fine grained alluvium within its confining rock walls. The alluvium is largely rock and stone free with the largest common sediment size being sands deposited in the alluvial levees. This has resulted in the formation of some of the best and most extensive agricultural land in the world, which have virtually no hard rocks or minerals. Prehistorically, and even today, rocks and minerals had to be imported from the

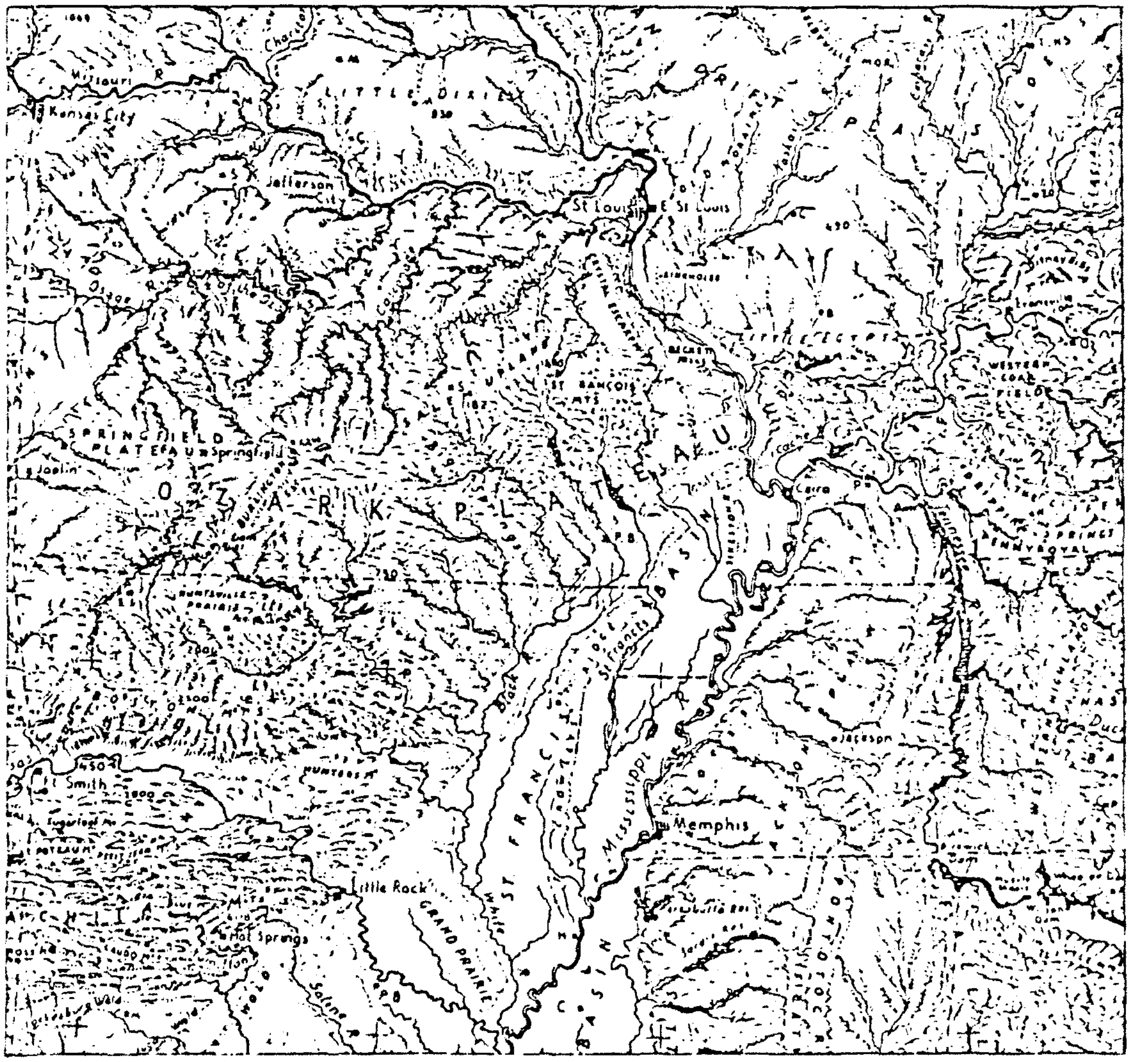


Figure 2. Central Mississippi River Valley Physiography (After Raisz 1978).

surrounding regions, especially Crowley's Ridge.

Crowley's Ridge was laid down in Pliocene times as terraces of the Mississippi River and the Ohio River. At that time the Ohio River had not been captured by the Mississippi and occupied the Eastern Lowlands. The terraces overlay limestone which is visible as weathered limestone spires in a few road cuts at the north end of the ridge. These terraces were laid down by rapidly moving water and contain many cobbles of virtually every kind of hard grained stone occurring in the whole Mississippi Basin. These were important resources for the stone age peoples of the lowlands. Much of the surface of Crowleys Ridge is covered with Pleistocene Loess.

The Mississippi River has also structured and continues to structure the transportational environment. The dominant direction of its movement from north to south has resulted in making resources upstream more accessible than those to the east or especially to the west. For example, in order to cross the valley at 36 degrees north latitude one must traverse three major rivers in addition to the Mississippi itself: the St. Francis, the Cache and the Black, all former channels of the Mississippi River in post Pleistocene times. In pre-automobile times, this was a tedious overland journey of 80 miles which involved crossing many bodies of water. This contrasts with 100 miles of floating downhill on the surface of the river. The river is still a major transportation artery for the central part of the continent and in earlier times was the only way to easily traverse this lowland region. In the 1845-48 period when the General Land Office (GLO) maps were made, all of the mapped settlements in the project area were positioned along the river.

The central Mississippi River valley is incised into the Ozark and Cumberland Plateaus. These coordinate proveniences were uplifted from the south by a tectonic plate movement from the southeast which pushed up the Ouachita Mountains and split the lower part of the Ozark-Cumberland plateau. At the time of this tectonic event, ca. 100 million years ago, these plateaus were inland seas with beachlines along the present course of the Boston Mountains in Central Arkansas and Sand Mountain/Walden Ridge in Alabama and Tennessee. These ancient sea beds are today limestones filled with many different kinds of cherts. While these cherts come from several different formations there is a great deal of variation within formations which is made more confusing by the tendency for these formations to have different names in different states. For example The Boone, Burlington and Ft. Payne "formations" are different names applied to the same formation in Arkansas, Missouri and Tennessee (respectively). There is a great deal of variation present within this structure and more formations than the above contain usable cherts. Figure 2 shows the source area of some of the more important lithic resources. Some of these have well known source areas, such as Dover, Mill Creek, Crescent and Illinois Hornstone. Other lithic resources occur over large areas; and/or do not have known quarries, though they may exist (Butler and May 1984).

Making the identification of these lithic resources more complex is the presence of Tertiary gravel beds around the edges of the Mississippian Embayment and on Crowley's Ridge. Crowley's Ridge is perhaps the most important of these because it occurs in the center of this stoneless plain. This deposit was lain down in Pliocene times when the river gradient was steeper than it is today. This deposit has virtually every heavy hard kind of mineral which occurs in the Mississippi River Basin. Prehistoric sites on the edge of the Western lowlands, even those situated directly on the Grandglaise Terrace show a marked preference for the lithics found in the Ozarks over those of the terrace (eg. 3IN17, Lafferty et al 1981). Much of the gravel deposits adjacent to the Mississippi Valley to the east are covered with Loess deposits up to 200 feet thick. Investigations have shown that as one approaches Crowley's Ridge from both the east and the west there is a marked increase in the occurrence of cobble chert on prehistoric sites (Shaw 1981). This is generally true even though through time there are documented changes in the prehistoric utilization of different lithic resources (Hemmings 1982; Lafferty 1984). Crowley's Ridge is currently the main source of gravel for both the Eastern and Western Lowlands. The rather intensive modern day use of gravel sometimes makes the identification of aboriginal tools from "gravel crusher produced artifacts" difficult. Since the St. Francis River was one of only three rivers to cut through Crowley's Ridge we would expect this to be a major lithic source area. Because it was and still is navigable by small craft, and because the river abuts against the ridge and erodes the gravel deposits, these are more accessible than at other smaller streams which have their source on the ridge.

One important class of lithic resources were the volcanic materials, particularly the basalts (for axes) which were obtained in the St. Francis Mountains. Also of importance from this quarter were ryolite and orthoquartzite which were used for various tools. The St. Francis River has its source in these deposits and the presence of both of these kinds of resources is to be expected on archeological sites.

When De Soto and his men reached the Great River in 1541, they looked upon a great transportation artery which stretched from the Gulf of Mexico to the heart of the continent. However, it was navigated and controlled by Native Americans with fleets of dugout canoes that were both to harass and assist the Spanish over the next several years. As they looked from the bluffs over the swampland of virgin forest, they never suspected that they were gazing upon both the graveyard and salvation of their expedition. Most of the next two months found the Spaniards slogging through one of the most difficult swamps encountered in the entire expedition, the St. Francis Sunk Lands (Morse 1981; Hudson 1984). However, the expedition was continually drawn back to the Great River and the high chiefdom cultures, which the Spanish dominated using the techniques used so effectively against the Aztecs and the Inca. The swampy lowlands impeded the expedition

particularly when traversing from east to west. As the Spanish reached the Grand Glacis terraces on the Ozark Escarpment, they encountered the great Toltec - Cahokia road (which would later be sequentially known as the Natchitoches Trace, the southwest Military road and currently US 67). This important road was on tractable ground with the swampy lowlands to the east and the more dissected plateau to the west. The expedition's speed doubled once they were on it. In the end, after many more side trips and high adventures, the hard pressed expedition made its escape down the Great River in boats constructed with nails forged from their weapons. They were harassed by the Indians in large fleets of canoes all the way to the Gulf of Mexico.

The early Euro-American penetration into this area followed Crowley's Ridge into the center of the Lower Mississippi Valley (Dekin et al 1978). This was also the route of the first railroad into the valley from St. Louis. Therefore, the physiography of the Central Mississippi River has to a large extent dictated the nature of life in this environment. Transportation was much easier by water though sometimes longer on the rivers, particularly the Mississippi. Overland travel was easiest by going around the lowlands or down Crowley's Ridge. That is, humans (Homo sapiens) did not penetrate or live in this environment unless they were equipped with boats, lines and other tools with which to deal with an aquatic environment. This lowland forest was rich in plants, animals and contained some of the most productive soils on the continent. Also, there was a great profusion of mineral resources to be had in and about the nearby uplands.

The structure of the regional physiography makes the project location a cross road of a major north-south overland route and the only east-west water route in this part of the valley. It has important lithic resources which were necessary for importations to the lowlands during prehistoric times and these were probably more available here naturally than at most areas on Crowley's Ridge because of the higher erosion rate by the river.

The St. Francis Gap physiography is the result of the erosion of the Pliocene period Crowley's Ridge deposits and subsequent deposition in the valley. The St. Francis River has incised over 200 feet into Crowley's Ridge (Figure 3). Saucier (1974) mapped much of the St. Francis Basin, and all of the project area, as Braided Stream Terrace. The oldest terrace is beside Crowley's Ridge, and younger terraces and sublevels stretch to the east. Cutting through this surface are the St. Francis and Little River which have laid down more recent alluvium parallel to the course of the river.

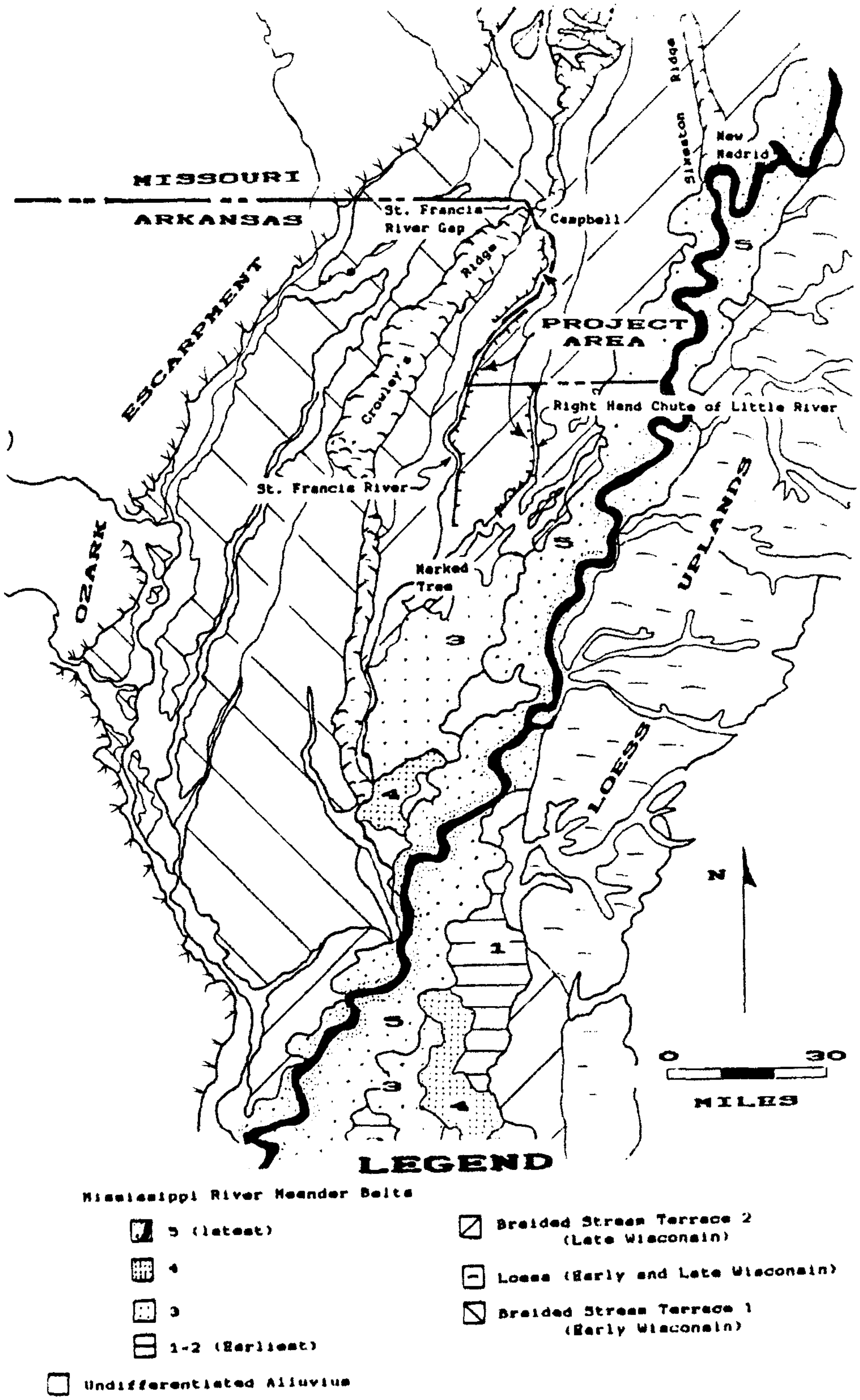


Figure 3. Major Landforms in the Central Mississippi Valley area (After Saucier 1974).

PROJECT AREA PHYSIOGRAPHY

The local environment has always been important to human survival, because this is where areal bound resources necessary for survival were obtained in the preindustrial world. The effect the local environment had on past cultures is often underestimated from our modern perspective - inside structures with controlled climates looking out on a largely artificial landscape.

The St. Francis River area is perhaps one of the most highly modified rural landscapes in North America. The major modifications to the landscape include: (1) timbering which has totally changed the biota. (2) Drainage of the swamps which has made agriculture possible in many parts of the watershed, and (3) landleveling which is changing the topography making agriculture more efficient and productive. These changes make it difficult to perceive, let alone measure, certain facets of the environment and often obscure the locations of cultural resources. Therefore, the methods of measuring certain past environmental variation must be indirect because natural topography, flora, and fauna are no longer present in the landscape (Beadles 1976, Figures 5 & 6).

The St. Francis River Basin is presently composed of three surfaces (Figure 4) laid down in the following sequence: the Relict Braided Surface, the Old Meander Belt and the Sunk Lands. All of these were deposited in Pleistocene and Holocene times under different climatic and riverine regimes (Saucier 1974).

The Relict Braided Surface

The Relict Braided Surface was deposited in terminal Pleistocene times by the meltwater from the continental glaciers. Saucier (1974) divides the Braided Stream Surface into two main terraces. The older terrace (T1) is primarily located west of Crowley's Ridge, but a small patch exists east of the ridge in the St. Francis Basin (Figure 3). This terrace is sandier and has greater relief than does the later Terrace 2. Saucier divides Terrace 2 into two sublevels. The project area is within the higher western Subterrace (Figure 3); however, it appears to be in the more recent alluvial terraces of the St. Francis and Little River not mapped as part of the Saucier project. On this subterrace he has traced the clay-filled channels of at least two separate river systems for some 60 miles (1970:9). This clarity of channel scars contrasts sharply with the situation on the adjacent lower and later eastern subterrace. There aggradation by the Mississippi River has reduced relief and obscured older channel scars with clayey backswamp soils. Therefore the soils in the project area are old and site location predictions based on this dimension should be valid for the past 8-10,000 years.

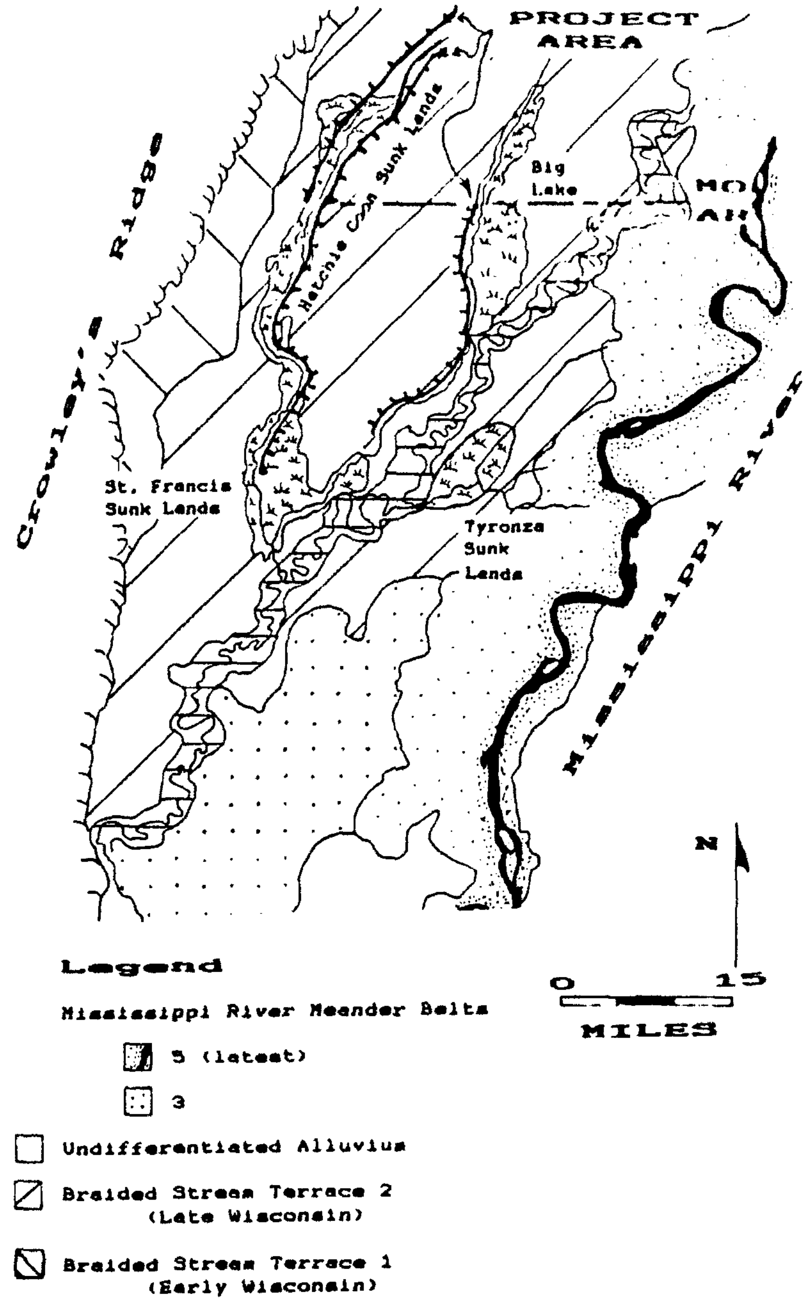


Figure 4. Project Area and the Sunk Lands (after Saucier 1970 and USGS Evadale Quad)

The Old Meander Belt

The Old Meander Belt was incised into the RBS sometime after it was deposited. Present archeological data from this surface suggests that this occurred in the Late Archaic period (ca. 3000 - 500 BC). It appears likely that this happened before the Ohio was captured by the Mississippi River. The wave length of the meanders are about 3.2 km (ca 2 miles) with a meander radius of about 800m (ca 1/2 mile). This compares to the modern wave lengths of about 11km (ca 7 miles) with 5km (ca 3 mile) meander radii. This indicates a much smaller flow than currently. The Old Meander Belt's course appears to have been abandoned sometime in the Woodland period (ca. 500 BC- AD 800); however, there have been crevasse breaks in the past century (USGS 1939) and this area was inundated during the 1927 flood. The earliest quadrangle maps for the project area shows the mid 19th century meander line of the Mississippi River well above the modern river banks in both the St. Francis and the RHCLR portions of the project area.

The construction of the Mississippi River Levee beginning in the 1860's and the subsequent construction of the drainage ditches has extended the natural watershed from three to ten miles further to the east and stopped the Mississippi River from meandering into the St. Francis and Tyronza Sunk Lands. These two construction projects have radically altered the hydrology and the biota of the project area.

The St. Francis Sunk Lands

The St. Francis Sunk Lands occupies the south portion of the project area. The origin of this low laying area is controversial. Saucier has argued that they existed prehistorically but historic accounts indicated that they were formed as a result of the New Madrid Earthquake of 1811-12. This and possible other earlier earthquakes also caused the many sand blows or patches of sand scattered over the clayey soils (especially the Sharkey clay) of the region. Sandblows are an earthquake phenomenon (Zoback et al 1980; Muller, Lafferty, Santeford and Everett-Dickenson 1975; Lafferty et al 1984a), and may be datable and therefore useful in establishing an earthquake chronology.

The St. Francis Seepage Project is in the recent alluvium of the St. Francis River and RHCLR and on terraces associated with the Relict Braided Surface. These surfaces are characterized by great deal of variation in their composition reflecting the position of any particular point in relation to a meander channel. For instance, silts and sand are deposited in long curving deposits which corresponded with the old levees. These are adjacent to Sharkey clays which are the clay channel plugs and backwater swamps. In general, the soils are better drained in the northern part of the project area (Figure 5).

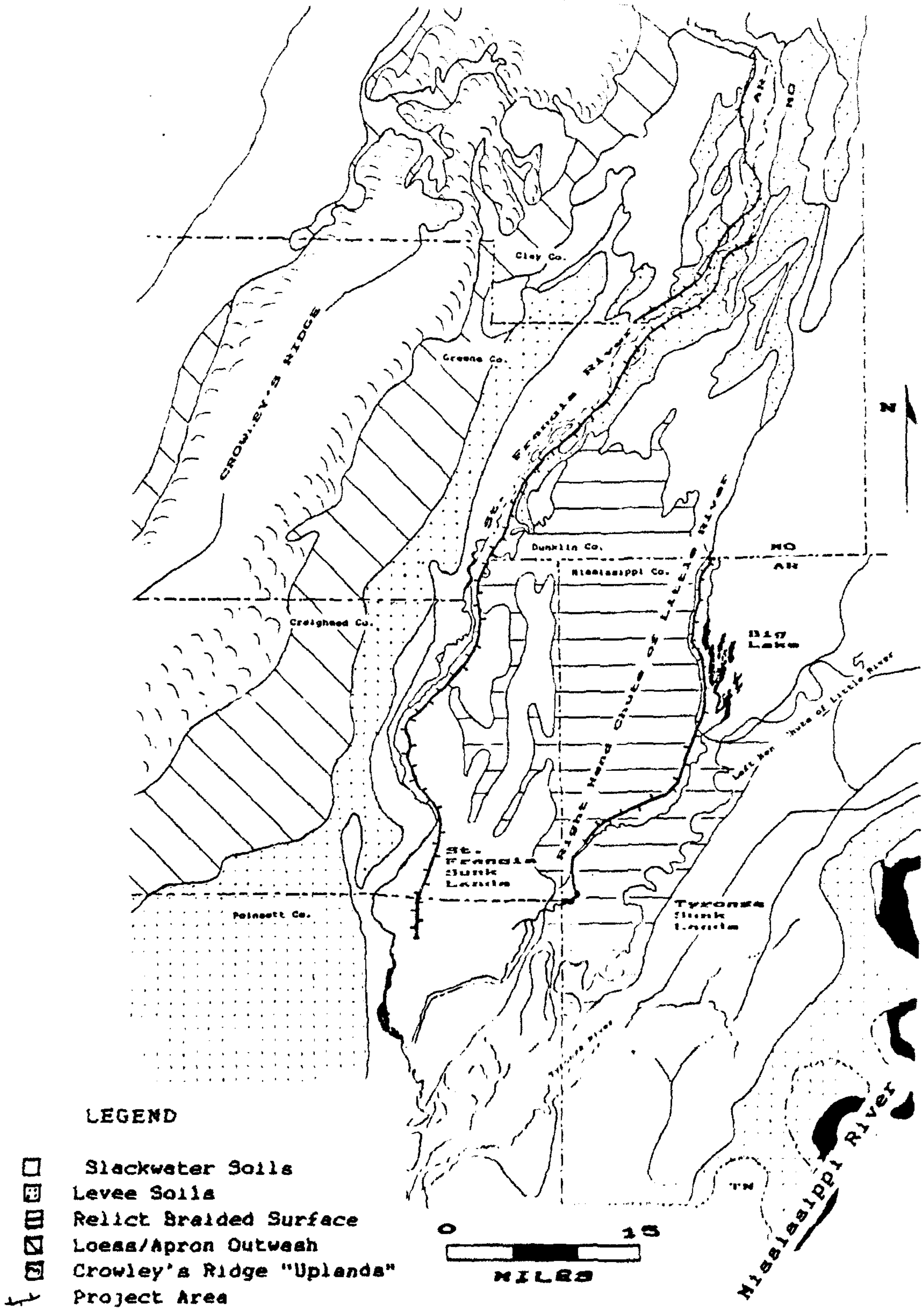


Figure 5. General Soils of the Lower St. Francis River Basin (After Ferguson and Grey 1971:General Soil Maps)

SOILS

Soils are the best indicators of past environments in the lower Mississippi Valley. This is due to two characteristics of riverine bottomland: (1) the manner of deposition effectively sorts different sized particles by elevation, and (2) relative elevation and the water table determine the kinds of biota which can inhabit a particular econiche. These relationships are well established by archeological, geological, and ecological research in the Lower Mississippi Valley (Lewis 1974; Beadles 1976; Harris 1980; Delcourt et al 1980; King 1980). These relationships are briefly discussed below and related to the basic dimensions utilized in this research: soils and plant communities.

Figure 7 presents a diagrammatic cross section of a riverine deposit. The river moves in the channel to the left. When it floods, the load capacity of the river is increased. When the river spills over its bank its velocity is immediately reduced which lowers its load capacity and the largest particles it is carrying are deposited. The repeated flooding will gradually build up a natural levee composed of the largest particles available, sands and silts under the current gradient. This process can be fairly rapid. For example, there are documented instances of as much as 2m of sand being deposited in one flood (Trubowitz 1984). As the levee builds up a backswamp forms away from the river and smaller particles, clays, are deposited under more slowly flowing slackwater conditions. Under a meandering regime, the river channel will eventually be cut off forming an oxbow lake. This will eventually fill with a clay plug. Many of these features are still directly observable on soil maps (Ferguson and Grey 1971) and in a few instances on topographic maps; however under the current landleveling practices these are rapidly disappearing.

In the following section we distinquish two spatial areas. These are determined by the boundaries of the counties in which the project area is located because this is how the soil data is presented. This area includes all of Dunklin, Clay, Craighead, Poinsett and Mississippi Counties and includes a sample of the Central Mississippi Valley from just west of Crowley's Ridge to the Mississippi River and from Piggott to just south of Marked Tree. This area we refer to as the "Project Area Counties" (PAC). The variation present in this area is greater than the immediate project area and gives some points of contrast. A measure of control is gained by defining a second comparative set as the different areas in the PAC with the same soil types as are found in the project area. (S-PAC). The project area soils were measured from the soil maps by methods discussed in Chapter 4.

Table 1 compares the proportions of each soil type in the PAC with those in the project area itself. Table 2 presents the depositional environments of the soils found in the project area counties which are based on the depositional environments described in the soil descriptions (Ferguson and Gray 1971:5-22;

Gurlly 1979:5-44; Ferguson 1979:4-24; Gray and Ferguson 1977:7-28; Fielder, Ferguson and Hogan 1978:8-19; Robertson 1969:6-27).

Five soils are associated with levee tops (Tables 1,2,& 3). These are the best drained soils in the project area. About 9.36% of the soils in the project area counties are classified as levee top soils, and are the best soils for agriculture in the pre-drainage landscape (Table 1).

Two soils are found on the lower parts of the natural levees which formed an ecotone (Tables 1,2, & 3). This environment was often seasonally flooded and as the levee built up, the particle sizes increased resulting in silts overlying clays. These are more poorly drained than the levee soils, but better drained than the swamp soils. These soils cover about 19.42% of the PAC.

Table 1. Mississippi, Craighead, Poinsett, Clay and Dunklin Counties Soils and those found in the project area

Type	PAC	Project Area
Alligator Clay	1.09	
Alligator-Steele	.08	
Alluvial Land	.02	
Amagon Sandy Loam	3.31	.82
Baldwin	.03	
Beulah	1.11	3.57
Bonn-Foley	.44	
Borrow Pit	0.22	
Bosket	.97	.52
Bowdre Silt Clay	1.04	1.16
Brandon	.14	
Brandon-Saffel	1.74	
Broseley	.41	.82
Bruno-Crevasse	.22	.35
Cairo Silty Clay	.79	
Calhoun Silt Loam	1.51	
Calloway Silt Loam	1.62	
Canalou Loamy fine Sand	.76	5.89
Collins Silt Loam	2.24	
Commerce Silt Loam	1.56	12.59
Convent Fine Sandy Loam	.91	
Cooter	.04	
Crevasse Loamy sand	.42	.15
Crowley Silt Loam	1.97	
Dexter Silt Loam	.60	
Dubbs	2.25	4.77
Dubbs-Silverdale	.67	
Dundee-Bruno-Commerce-Dubbs-Silverdale Complexes	1.93	2.88
Dundee Silt Loam	5.41	8.43
Earle Clay	.26	
Falaya Silt Loam	2.88	6.88

Table 1 Continued. Mississippi, Craighead, Poinsett, Clay and Dunklin Counties Soils and those found in the project area

Type	PAC	Project Area
Farrenburg Fine Sandy Loam	.35	1.55
Foley Silt Loam	3.62	
Foley-Calhoun	.21	
Forestdale Silt Loam	.18	
Forestdale - Routon	.07	
Fountain Silt Loam	2.70	1.16
Gideon Loam	1.03	2.67
Grenada Silt Loam	.47	
Hayti Fine Sandy Loam	1.43	1.85
Henry Silt Loam	3.85	
Hilleman Silt Loam	3.46	
Iberia Clay	.06	
Jackport Silty Clay	3.42	
Jeanerette Silt Loam	.33	
Kobel	1.55	.90
Lafe Silt Loam	.13	
Lilbourn Fine Sandy Loam	.56	4.60
Loring	3.87	
Malden Fine Sand	1.02	.86
Memphis	.92	
Memphis-Loring	.27	
Mhoon	2.94	6.32
Morganfield Fine Sandy loam	.22	
Orthents	.03	
Orthents-Water Complex	.18	
Patterson Fine Sandy Loam	.43	5.29
Roellen Silty Clay	.60	.21
Routon	2.20	8.00
Sharkey Clays	9.63	11.50
Sharkey-Crevasse	0.52	
Sharkey-Steele	8.33	
Sikeston loam	.28	
Steele	1.19	3.08
Steele-Cravasse	.18	
Steele-Tunica	.88	
Tichnor	.96	
Tiptonville-Dubbs Silt Loam	.35	1.63
Tuckerman Fine Sandy Loam	.08	
Tunica Silty Clay	3.40	.64
Wardell	.65	.30
Mississippi Levee	.20	
Water Areas	.55	
Udorthents	.03	
Pits, Gravel	.01	
Totals (percent)	100.0	100.0
Total acres represented	1,839,296	

Twelve soils were general levee soils where position in the levee is not specified (Table 2). These comprise 23.29% of the project area and undoubtedly contain both high and low levee soils.

Sixteen soils were formed in slackwater conditions found in swamps and oxbow lakes. These are clays and cover about 47.93% of the PAC. These soils were inundated and not farmable in the predrainage landscape. This contrasts with 0-6% of the counties which in 1971 were classified as water areas (Table 1).

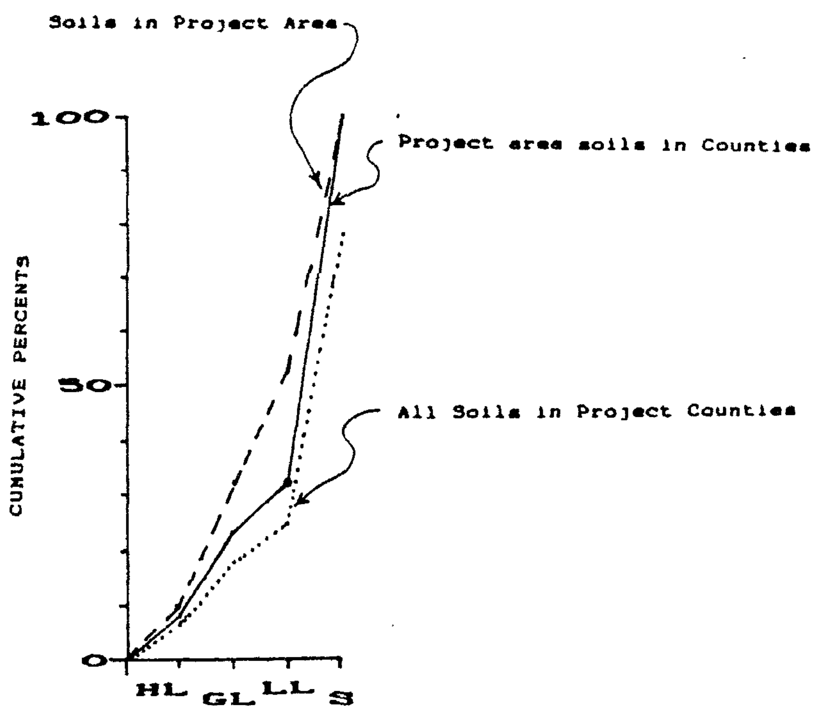
About 0.55% of the PAC is classified as non-soil areas. Alluvial lands consist of areas along the Mississippi River which are still undergoing alluviation. None of these are found in the project area. About .25 percent of the project counties consist

Table 2. Depositional Environments of Project Area Soils

High Levee	General Levee
Beulah	Broseley
Bosket	Canalou Loamy Fine Sand
Bruno-Crevasse	Dubbs-Silverdale
Crevasse Loamy Sand	Dundee-Bruno-Commerce-Dubbs-Silverdale Complexes
Dubbs	Farrenburg
	Hayti Fine Sandy Loam
	Lilbourn Fine Sandy Loam
	Malden Fine Sand
	Patterson Fine Sandy Loam
	Routon
	Wardell
Low Levee	**Slack Water**
Dundee Silt Loam	Amagon Sandy Loam
Tiptonville-Dubbs-Silt Loam	Bowdre Silt Clay
	Cairo Silty Clay
	Commerce Silt Loam
	Falaya Silt Loam
	Fountain Silt Loam
	Gideon Loam
	Kobel
	Mhoon
	Roellen Silty Clay
	Sharkey Clays
	Sharkey-Crevasse
	Sharkey-Steele
	Steele
	Steele-Tunica
	Tunica Silt Clay

Table 3. Comparison of Different Soils in Project Area, S-PAC, and PAC

	Project Area %	Cum. %	S.-PAC	Cum. %	PAC %	Cum. %
High Levee	9.36	9.36	7.91	7.91	6.19	6.19
General Levee	32.04	32.65	15.70	23.61	12.81	18.47
Low Levee	10.06	52.07	9.16	32.77	7.17	25.64
Slackwater	47.93	100.00	67.23	100.00	52.76	100.00
T Max			19.30		26.43	



HL=High Levee Soils; GL=General Levee Soils; LL=Low Levee Soils; S=Slackwater soils

Figure 6. Project Area Soils Compared to PAC and S-PAC Soils

of the Mississippi River Levee, which is the eastern watershed boundary. Borrow pits, ditches, orthents (water filled gravel pits on Crowley's Ridge), udorthants (gravel pit spoil areas) and lakes comprise the other non-soil areas. Several of the former are present in the project area.

A comparison of the percentage composition of the soils in the PAC and those found in the project area (Table 3 & Figure 6), along the ditches indicates that there are certain biases in this sample which corresponds to the desirability of placing the flood control levees high in the landscape (Table 3). The project area has 52.7% of the area composed of levee soils with only 32% of the S-PAC has levee soils. When including the more distant parts of the counties only 18.47% of the PAC is composed of levee soils.

In contrast to this sample space is the Tyronza project in Mississippi County, Arkansas, west of the St. Francis Seepage Project. The project environment data was derived from the total areas in the Meander Belt. The low position of the drainage ditches are reflected by the high percentages of Sharkey clay in both the Phase I (50%) and Phase II (81%). Not surprising is the large amount of the Phase II area which was apparently under water during predrainage times. We believe that this is a major factor in the low number of sites discovered in the Phase II project (Lafferty et al 1985). While the soil variables are in different proportions in the Tyronza and St. Francis project areas, they have soils of the same geologic ages and derived by the same process and are therefore directly applicable.

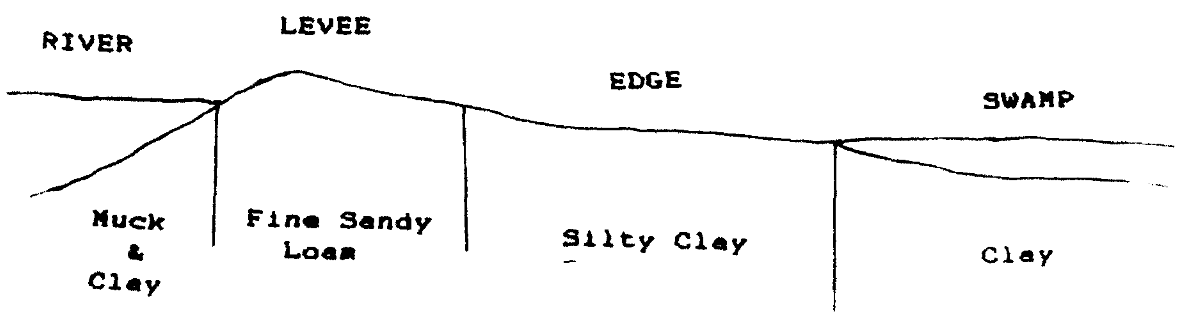


Figure 7. Cross section of riverine soils and plant communities (after Lewis 1974)

SOILS AND BIOTIC COMMUNITES

The relationship of biota to riverine features in the Lower Mississippi Valley is well known (Lewis 1975; Lafferty 1977; Butler 1978; Morse 1981). Because of the radical changes in the environment in the past century all of these are reconstructions based on named witness trees in the GLO survey notes. These studies have consistently identified plant communities associated with particular soil types which are diagrammatically presented in Figure 7.

There are two plant communities associated with the levees, the Sweetgum Elm Cane Ridge Forest and the Cottonwood-Sycamore Natural Levee Forest. These plant communities were the driest environments in the natural landscape and had a high potential for human settlement. These two plant communities are in fact successional stages with the Cottonwood-Sycamore forest being found along active river channel while the Cane Ridge Forest is found on the levees of abandoned courses.

There are four aquatic biotic communities: river, lake, marsh and swamp. These low laying areas are unsuitable for human occupation. Several of these are involved in successional sequences; however, since about the Middle Woodland period all were present at any given time prior to drainage.

Between these two extremes are the river edge communities and the seasonal swamps. In drier times the latter contained areas suitable for occupation. The former is a line like interface with a steep slope and little substantial flat area.

The correlation between soils and plant communities is not a 1:1 ratio. These deposits are building up and what was at one time a swamp may in a few decades become a dry levee. This process brings about biotic successional changes. However, there is a high correlation between soils and last sucessional stage plant communities. Because the surface is aggrading, the widest possible extant of habitable dry land as it was prior to levee construction and drainage is modeled. This combines the two successional stages of levee biotic communities which are indistinguishable with the synchronic perspective embodied in our data. The edge communities are lumped together, as are the aquatic environments. These cannot be distinguished in further detail with our present level of data and it is probable that greater precision may be spurious. These communities are all modeled from the last stages of deposition.

Research using soils and plant communities to model prehistoric occupation in Northeast Arkansas (Dekin et al 1978; Morse 1981; Lafferty et al 1984), in the adjacent portions of the Missouri Boothill (Lewis 1974; Price and Price 1980), and in the lower Ohio Valley (Muller 1978, Lafferty 1977, Butler 1978) have all suggested that sites are preferentially located on levee soils and are not found in aquatic deposits. Therefore these

grouping of soils into biotic communities should yield a more powerful model that should be applicable to the whole project area.

MACROBIOTIC COMMUNITIES

These three "Macrobiotic" communities - levee, ecotone, and swamp - are composed of different species of plants and animals. Table 4 presents an arboreal species composition reconstructed in Mississippi County, Missouri (Lewis 1974:19-28).

Levee

The Levee Macrobiotic Community includes two plant communities: (1) the Cottonwood-Sycamore community found along the active river channel and (2) the Sweetgum-Elm Cane Ridge forest on abandoned courses. The arboreal species found in the Sweetgum-Elm community include all of the species found along the natural levee, however, their mix is considerably different. These two communities are in the highest topographic position in the county and these areas also supported a dense understory of plants including cane (Arundinaria gigantea), spice bush (Lindera Benzoin), pawpaw (Asimina triloba), trumpet creeper (Campsis radicans), red bud (Cercis canadensis), greenbrier (Smilax sp.), poison ivy (Rhus radicans) and a number of less frequent herbaceous plants. The most common of these was cane which often formed nearly inpenetrable cane brakes. These provided cover for many of the larger species of land animals and were an important source of weaving and construction material.

The major mammals included in this biotic community included white tailed deer (Ondocoileus virginianus), cougar (Felis concolor), black bear (Ursus americanus), elk (Cervis canadensis), skunk (Mephitis mephitis), opossum (Didelphus marsupialis), raccoon (Procyon lotor), eastern cottontail rabbit (Sylvilagus floridanus), gray fox (Urocyon cinereoargenteus), and grey squirrel (Sciurus carolinensis). Important avian species included the wild turkey (Meleagris gallopavo), the prairie chicken 'Tympanuchus cupido), ruffled grouse (Bonasa umbellus), passenger pigeon (Ectopistis migratorius) and carolina paroquet (Conuropsis carolinensis).

Prior to artificial levee construction the natural levees were the best farmland in this environment. This is due to their location at the highest elevations from which tne spring floods rapidly receded and drained. This environment provided for a large number of useful species of plants and animals making it an attractive place for settlement at virtually all times (except during floods) since they were laid down.

Table 4. Arboreal species composition of three biotic communities in Mississippi County, Missouri

Species	Levee	Edge	Swamp
American Elm (*Ulmus* sp.)	23	19	
Ash (*Fraxinus* sp.)	11	14	2
Bald Cypress (*Taxodium distichum*		7	50
Black Gum (*Nyssa sylvatica*)	T	1	
Blackhaw (*Viburnum* sp.)	T		
Black Walnut (*Juglans nigra*)	2		
Box Elder (*Acer Negundo*)	2		
Cherry (*Prunus* sp.)	T		
Cottonwood (*Populus* sp.)	1	3	
Dogwood (*Cornus* sp.)	1		
Hackberry (*Celtus occidentalis*)	12	9	
Hickory, (*Carya* sp.)	5	4	
Shellbark (*Carya laciniosa*)	T		
Hornebeam (*Ostrya virginiana*)	2		
Kentucky Coffee Tree(*Gymnocladus dioica*)	T		
Locust, ?	T		
Black (*Robinia pseudo-acacia*)	T		
Honey (*Gleditsia Triancanthos*)	T	1	14
Maple, (*Acer* sp.)	3	8	
Sugar (*Acer Saccharum*)	1		
Oak, Black (*Quercus velutina*)	5	2	
Burr (*Quercus macrocarpa*)	1	3	2
Overcup (*Quercus lyrata*)	1		
Post (*Quercus stellata*)	T		
Red (*Quercus rubra*)	1	1	
Spanish (*Quercus falcata*)	1		
Swamp (*Quercus bicolor*)	T	1	
White (*Quercus alba*)	1	1	
Pecan (*Carya illinoensis*)	1	1	
Persimmon (*Diospyros virginiana*)	T	2	2
Plum (*Prunus* sp.)	T		
Red Haw (*Crataegus* sp.)	T	1	11
Red Mulberry (*Morus rubra*)	T		
Sassafras (*Sassafras albidum*)	T		
Sweetgum (*Liquidamber styraciflua*)	20	18	
Sycamore (*Platanus occidentalis*)	1		
Willow (*Silix* sp.)	1	2	18

Abreviations: T=Trace (i.e. (1%); W=known preferred wood; F= known Food Resource; D=Known drink resource. Data based on Lewis 1974:18-28.

Levee/Swamp Ecotone

This modeled Macrobiotic community is what Lewis (1974:24-25) has called the Sweetgum-Elm-Cypress Seasonal Swamp. This ecotone had fewer species present at any one time and a noticeably clear understory. The arboreal species composition (Table 4) includes more water tolerant species (Cypress, Willow and Red Haw) and at times had aquatic animal species. These areas were flooded regularly every year for several weeks to several months and the soils retained the moisture longer than on the levees. These locations were clearly much less desirable for occupation than were the levees, but were easy to traverse in dry periods.

Different faunas also occupied the area at different seasons drawn from the adjacent swamps and levees. In addition this was a preferred habitat of the giant swamp rabbit (Sylvilagus aquaticus) and crawfish. In the changing of this environment from a wetland to a dry open swampscape it is probable that many aquatic species, such as fish, were stranded and scavenged by the omnivors of the forest. These soils are characteristically poorly drained due to the presence of clays in the upper horizons. In this environment normally aquatic trees, especially cypress, would have been exploitable with land based technology.

Swamp

Included in this modeled strata are all of the different environments which were underwater prior to drainage. This is defined by all of the soils deposited in slackwater conditions which are also the lowest laying parts in the project area. Before the drainage the following different ecozones were included under this rubric: River channels, Lakes, marsh and Cypress Deep Swamp. These are different successional stages in this environment, but all are aquatic. The only one of the three which have arboreal species is the Cypress Deep Swamp (Table 4).

Several important herbacious species were found in these aquatic environments. These included cattails (Typha latifolia), various grape vines (Vitis sp.), Button bush (Cephalanthus occidentalis), and hibiscus (Hibiscus sp.). The latter were an important source of salt (Morse and Morse 1980).

The fauna of the aquatic environment was quite different from the terrestrial species, which mostly only penetrated the edge of the swamp. Beaver, mink and otter were important swamp mammals. Of special interest were fish and waterfowl which were in large quantities in this great riverine flyway. In order to exploit these resources a means of water transportation is necessary. Dugout canoes have been dated to at least 1000 BC and it is likely that they are a great deal earlier.

Table 5. Project area and predrainage environments

Macrobiotic Community	Project Area	S-PAC	PAC
Levee	32.65	23.21	18.47
Backslope	19.42	9.16	7.17
Swamp	47.93	67.23	52.66
Uplands	0.00	0.00	21.70
Total	100.00	100.00	100.00

The St. Francis River Gap has more upland species of native plants and animals than do the surrounding lowlands (cf. Fehon 1975). The St. Francis River has incised into the Relict Braided Surfaces. The two terraces of the Relict Braided Surface join at the north limits of the project area. There are a few streams which have cut across the surface. Even in the more poorly drained locations, where today one sees standing water in the soybeans, prehistorically there would have been more water taken up by the canopy and roots of the trees.

Crowley's Ridge possesses unique plant communities in the mid continent (Arkansas Natural Plan 1978). It is the western limit for certain eastern species such as the tulip popular (Liriodendron tulipifera) and Beech (Fagus grandifolia) (Harlow and Harrar 1968:284,365). The tulip popular was a preferred wood among the southeastern Indians for making the largest canoes (Lafferty 1977) and it would have been in high demand by the peoples of the Eastern and Western Lowlands where it did not grow.

There is considerable evidence that the environment has undergone substantial changes through the past 10.000 years (Cf. Delcourt et al 1980). Major changes involve the general warming with the retreat of the Wisconsin glaciers, a long period of dessication during the Middle Archaic period and since then wetter climates similar to the present. Morse and Morse (1983) have a detailed summary of these changes in the region.

Today the St. Francis River valley is on the edge of one of the great agricultural areas of the World -- the Mississippi River flood plain. The flat parts of the valleys have large fields of row crops growing on the white clays of the Relict Braided Surface. These abruptly abut against the orange upland soils of Crowleys Ridge at the edges of the valley. This flat surface is broken by the St. Francis River supporting an edge forest of Cypress, Sycamore (*Platanus occidentalis*), White Oak (*Quercus alba*), Black Oak (*Quercus velutina*),and Poison Ivy (*Rhus radicans*). There a still a few hundred acres of flatland forest. The upland areas still support large amounts of forest interspersed with pastures which support cattle (*Bos sp.*).

Prehistorically this gap must have seemed like an upland heaven to the water logged lowlanders. Here were cutting edges and a great diversity of plants and animals not easily found or seldom present in the swamps. The accessibility of these resources by lowlanders makes the St. Francis Gap a rare kind of environment which makes the archeological sites of regional importance to understanding the prehistoric procurement systems. This is especially true of the lithics which were the basic cutting edge of their technology.

CHAPTER 3

PREVIOUS RESEARCH

by

Robert H. Lafferty III

INTRODUCTION

Archeological research has been carried out in Northeast Arkansas and Southeast Missouri for nearly a century (Table 6). As with much of the Mississippi Valley the earliest work was done by the Smithsonian Mound Exploration Project (Thomas 1894) which recorded the first site in the region. Most of these were the large mound groups. Since that time a great deal of work has been done in the Central Mississippi Valley area (cf. Willey and Phillips 1958 for definitions of technical terms) which has resulted in several extensive syntheses of the region's prehistory (Morse and Morse 1983; Chapman 1975, 1980). In this chapter we summarize the archeological research which has taken place, summarize what is known of the prehistory of the region and limits in this data as it applies to the St. Francis River locality. Finally we outline some major research questions which are directly relatable to the data base recoverable in the sites so far identified in the project area.

PREVIOUS ARCHEOLOGICAL RESEARCH

The earliest professional archeological work in the region was the work carried out by the mound exploration project of the Smithsonian Institution (Table 6). Thomas (1894) and his associates excavated at three sites near the project area: Taylor's Shanty, Tyronza Station and the Jackson Mounds. These were all Mississippi period sites located outside of the project area. This work was principally excavation in large mound sites, and identified the American Indians as the authors of the great earthworks of the eastern United States.

Table 6. Previous Archeological Investigations in the Castor River Gap and the adjacent areas.

Investigator	Location and Contribution
Potter 1880	Archeological investigations in Southeast Missouri
Evers 1880	Study of pottery of southeast Missouri
Thomas 1894	Mound exploration in many of the large mound sites in SE Missouri, and northeast Arkansas
Fowke 1910	Mound excavation in the Morehouse Lowlands.
Moore 1910	Excavation of large sites along the St. Francis, White and Black Rivers.
Adams and Walker 1942	Survey of New Madrid County
Walker and Adams 1946	Excavation of houses and palisade at the Mathews site
Phillips, Ford, and Griffin 1951; Phillips 1970	Mapped and sampled selected sites in SE Missouri, and NE Arkansas Lower Mississippi Valley Survey (LMVS), proposed ceramic chronology.
S. Williams 1954	Survey and excavation at several major sites in SE Missouri, original definition of several Woodland and Mississippi phases
Chapman and Anderson 1955	Excavation at the Campbell site, a large Late Mississippian Village in SE Missouri
Moselage 1962	Excavation at the Lawhorn Site, a large Middle Mississippian Village in NE Arkansas
J. Williams 1964	Synthesis of fortified Indian villages in S. E. Missouri
Marshall 1965	Survey along I55 route, located and tested many sites east of project area
Morse 1968	Initial testing of Zebree and Buckeye Landing Sites

Table 6 (Continued). Previous Archeological Investigations

Reference	Location and Contribution
J. Williams 1968	Salvage of sites in connection with land leveling, Little River Lowlands
Redfield 1971	Dalton survey in Arkansas and Missouri Morehouse Lowlands
Schiffer & House 1975	Cache River survey
Price et al 1975	Little Black River Survey
Morse and Morse 1976	Preliminary Report on Zebree excavations
Chapman et al. 1977	Investigations at Lilbourn, Sikeston Ridge
Harris 1977	Survey along Ditch 19, Dunklin County, Missouri
Klinger and Mathis 1978	St. Francis II Cultural Resource Survey in Craighead and Poinsett County, Arkansas
LeeDecker 1978	Cultural Resources Survey, Wappallo to Crowleys ridge
Padgett 1978	Initial Cultural Resource Survey of the Arkansas Power and Light Company transmission line from Keo to Dell, Arkansas
I. R. I. 1978	Cultural Resources Survey and testing, Castor River Enlargement project.
Dekin et al 1978	Cultural Resources overview and predictive model, St. Francis Basin
Morse 1979	Cultural Resource survey inside Big Lake National Wildlife Refuge
J. Price 1979	Survey of Missouri and Arkansas Power Corporation power line in Dunklin County, Missouri
LeeDecker 1980	Cultural Resource survey, Ditch 81 control structure repairs
Morse and Morse 1980	Final report to COE on Zebree project

Table 6 (Continued). Previous Archeological Investigations

Reference	Location and Contribution
J.Price 1980	Archeological investigations at 23DU244, limited activity Barnes site, Dunklin County Missouri
J. Price 1980	Cultural Resource survey, near St. Francis River, Dunklin County, Missouri
Price and Price 1980	A Predictive Model of archeological site frequency, transmission line, Dunklin County, Missouri
C. Price 1982	Cultural Resource survey, runway extension, Kennett Airport, Dunklin County Missouri
Lafferty 1981	Cultural Resource survey of route changes in AP&L Keo-Dell transmission line
J.Price and Perttula	Cultural Resource survey of areas disturbed by sewer system, Arbyrd, Missouri
Klinger 1982	Mitigation of Mangrum Site
Santeford 1982	Testing of 3CG713
Bennett and Higginbotham 1983	Mitigation at 23DU227, Late Archaic thru Mississippian site
J. Price 1983	Phase II testing of Roo sites, Kennett Airport, Dunklin County, Missouri
J. Price 1984	Testing Shell Lake Site, Lake Wappapello
Chapman 1975, 1980	Synthesis of Archeology of Missouri
Morse and Morse 1983	Synthesis of Central Mississippi Valley pre-history
Lafferty et al 1984, 1985	Cultural Resource survey, testing and predictive model, Tyronza Watershed, Mississippi County, Arkansas

Most of the early work was concerned with the collection of specimens for museums (e.g.,Potter 1880; Moore 1910; Fowke 1910). Some of this data was used to define the great ceramic traditions in the eastern United States (Holmes 1903), including the Mississippian. Many of these original conceptualizations are still the basis on which our current chronologies are structured (eg. Ford and Willey 1941; Griffin 1952; Chapman 1952, 1980).

There was a hiatus in the archeological work in the region until the 1940's when Adams and Walker began doing the first modern archeological work for the University of Missouri (Adams and Walker 1942; Walker and Adams 1946). Beginning in 1939 the Lower Mississippi Valley Survey conducted a number of test excavations at many of the large sites in the region (Phillips, Ford, and Griffin 1951; S. Williams 1954). This work has continued to the present in different parts of the valley (e.g., Phillips 1970; S. Williams 1984). This project has produced definitions of many of the ceramic types in the Lower Mississippi Valley area and produced the first phase definitions for many of the archeological manifestations known in the latter part of the archeological record, particularly the Barnes, Baytown, and Mississippian traditions of the north (S. Williams 1954). The sites discovered on the Missouri side of the St Francis River in the project area are all of the known sites in the Missouri portion of the project area.

Beginning in the 1960's there has been an increase in the tempo and scope of archeological work carried out in the region. This has included a large number of survey and testing projects carried out with respect to proposed Federally funded projects (Marshall 1965; Williams 1968; Hopgood 1969; Krakker 1977; Gilmore 1979; IRI 1978, Dekin et al 1978, Lafferty 1981; Morse and Morse 1976, 1980; Morse 1979; Klinger and Mathis 1978; Klinger 1982; Padgett 1978; C. Price 1976, 1979,, 1980; J. Price 1976a, 1976b, 1978; Greer 1978; LeeDecker 1979; Price, Morrow and Price 1978; Price and Price 1980; Santeford 1982; Sjoberg 1976; McNeil 1980, 1981, 1984; Klinger et al 1981). These projects are generally referred to as Cultural Resources Management studies and have greatly expanded the number of known sites from all periods of time. These projects have also produced a large body of data on the variation present on a range of different sites and have greatly expand our knowledge of this area.

Along with these small scale archeological projects there was a continuation of the large scale excavation projects carried out in the region. Major excavations at the Campbell site (Chapman and Anderson 1955), Lawhorn (Moselage 1962), Snodgrass site (Price 1973, 1978; Price and Griffin 1979), Lilbourn (Chapman et al 1977; Cottier 1977a, 1977b; Cottier and Southard 1977), and Zebree (Morse and Morse 1976, 1980) have greatly expanded our understanding of the Mississippian cultures. It has resulted in the definition of the temporal/ spatial borders between different Woodland and Mississippian manifestations, and resulted in definitions of assemblages. Several major syntheses have resulted

(Chapman 1975, 1980; Morse 1982a, 1982b; Morse and Morse 1983) which provide up to date summaries and interpretations of the work which has been carried out in the region.

STATUS OF REGIONAL KNOWLEDGE

The above and other work in adjacent regions has resulted in the definition of the broad pattern of cultural history and prehistory in the region; this, however, is still very sketchy with very few Archaic and Woodland sites having been excavated. This has seriously constrained our understanding of settlement systems. Therefore, while this may be a fairly well known region in respect to the Mississippi period, much more work needs to be done before the basic contents and definitions of many archeological units in space and time are adequate (cf. Morse 1982a). Presently we have a few key diagnostic types associated with some cultural units; however, the range of artifact assemblage variation across chronological and spatial boundaries are not yet defined, nor are the ranges of site types known for any of the defined units. The adequate definition and resolution of these fundamental questions and problems are necessary before we can begin to reconstruct and use the data for understanding more abstract cultural processes as is possible in better known archeological areas such as the American Southwest. These fundamental problems will be the basis for arguing significance or non significance of the sites discovered in terms of Criterion d of the NRHP criteria (36 CFR 60). The cultural resources identified in this project are interpreted temporally and spatially in terms of what is known of the archeological record.

<u>The Paleo-Indian period (10,000-8,500 B.C.)</u> is know in the region from scattered projectile point finds over most of the area. These include nine Clovis and Clovis like points from the Bootheel (Chapman 1975:93). No intact sites have yet been identified from this period, and the basal deposits of the major bluff shelters thus far excavated in the nearby Ozark Mountains have contained Dalton period assemblages. Lanceolate points are known from bluff shelters and high terraces (Sabo et al 1982:54) which may represent different kinds of activities or extractive sites as they have been shown to have been in other parts of the country. For the present any Paleo-Indian site in the region is probably significant.

<u>The Dalton period (8,500-7,500 B.C.)</u> is fairly well known in the Ozarks with modern controlled excavations from Rogers, Albertson, Tom's Brook, and Breckenridge Shelters (McMillian 1971, Kay 1980; Dickson 1982; Logan 1952; Bartlett 1963, 1964; Wood 1963; Thomas 1969). Adjacent areas of the Lower Mississippi Valley have produced some of the better known Dalton components and sites in the central continent. These include the Sloan site (Morse 1973) and the Brand site (Goodyear 1974). These and other more limited or specialized excavations and analysis have resulted in the identification of a number of important Dalton tools

(ie. Dalton points with a number of resharpening stages, a distinctive adze, spokeshaves and several varieties of unifacial scrapers, stone abraders, bone awls and needles, mortars, grinding stones and pestals. At least three different sites types have been excavated: the bluff shelters which were seasonal habitation sites, a butchering station (the Brand Site) and a cemetery (Sloan site). Presently we do not have the other part(s) of the seasonal pattern which should be present in the region, nor have any specialized activity sites been excavated. Dalton sites are known in a number of locations, especially on the edge of the Relict Braided Surface, on Crowley's Ridge, and the edge of the Ozark Escarpment. Given the present resource base there are a number of important questions which have been posed concerning this early widespread adaptation to this environment (Price and Krakker 1975; Morse 1982a).

<u>The Early to Middle Archaic periods (7,500 - 3,000 B.C.)</u> are best known from bluff shelter excavations in the Ozarks (Rogers, Jakie's, Calf Creek, Albertson, Breckenridge and Tom's Brook Shelters). During this long period a large number of different projectile point types were produced (ie. Rice Lobed, Big Sandy, White River Archaic, Hidden Valley Stemmed, Hardin Barbed, Searcy, Rice Lanceolate, Jakie Stemmed, and Johnson). No controlled excavations have been done at any Early or Middle Archaic site in southeast Missouri or northeast Arkansas (Chapman 1975:152). There are no radiocarbon dates for any of the Archaic period from southeast Missouri (Dekin et al 1978:78-79; Chapman 1980:234-238). The Middle Archaic archeological components are rare to absent in the Central Mississippi Valley (Morse and Morse 1983). Therefore, much of what we know of the archeological manifestations of this period is based on work in other regions, which has been extrapolated to the Mississippi Valley based on surface finds of similar artifacts. At present phases have not been defined.

<u>The Late Archaic (3,000 B.C. - ~500 B.C.)</u> appears to be a continuing adaptation to the wetter conditions following the dry Hypsithermal. This corresponds to the sub-Boreal climatic episode (Sabo et al 1982). The lithic technologies appear to run without interruption through these periods with ceramics added about the beginning of the present era. Major excavations of these components have taken place at Poverty Point, and Jaketown in Louisiana and Mississippi (Ford, Phillips and Haag 1955, Webb 1968). A fairly large number of Late Archaic sites are known in eastern Arkansas and Missouri (Chapman 1975:177-179,224; Morse and Morse 1983:114-135). Major point types include Big Creek, Delhi, Pandale, Gary and Uvalde points. Other tools include triangular bifaces, manos, grinding basins, grooved axes, atlatl parts and a variety of tools carried over from the earlier periods such as scrapers, perforators, drills, knives and spokeshaves. Excavations at the Phillips Spring site has documented the presence of tropical cultigens (squash and gourd) by ~2,200 B.C. (Kay et al 1980). The assemblages recovered in the bluff shelters from this time period indicate that there was a change in the use from general occupation to specialized hunting/butchering stations

(Sabo et al 1982:63). There are some indications of increasing sedentariness in this period; however, the range of site types have not been defined. Late Archaic artifacts are well known from the region with artifacts usually present on any large multicomponent site. Our understanding of this period is limited to excavations from a few sites (Morse and Morse 1983; Lafferty 1981). At present we do not know the spatial limits of any phases (which have not been defined), nor do we have any control over variation in site types and assemblages.

Early Woodland (500 B.C.(?) - 150 B.C.). During this period there appears to have been a continuation of the lithic traditions from the previous period with an addition of pottery. As with the previous period this is a very poorly known archeological period with no radiocarbon dates for the early or beginning portions of the sequence. The beginning of the period is not firmly established and the termination is based on the appearance of Middle Woodland ceramics dated at the Burkett site (Williams 1974:21). The original definition of the Tchula period was made by Phillips, Ford and Griffin (1951:431-436). In the intervening time a fair amount of work has been done on Woodland sites. Chapman concludes that we are not yet able to separate the Early Woodland assemblages from the components preceeding and following. At present there is considerable question if there is an Early Woodland period in S. E. Missouri (Chapman 1980:16-18). However, recent work in northeast Arkansas has identified ceramics which appear to be stylistically from this time period (Morse and Morse 1983; Lafferty et al 1985) and J. Price (personal communication) has identified a similar series of artifacts in the Boothill region. Artifacts include biconical "Poverty Point Objects," Cordmarked pottery with noded rims similar to Crab Orchard pottery in Southern Illinois and the Alexander series pottery in the Lower Tennessee Valley, and Hickory Ridge points.

Middle - Late Woodland periods (150 B.C.- A.D. 850) was a period of change. There is evidence of participation in the "Hopewell Interaction Sphere" (Dentate and zone stamped pottery, exotic shell; Ford 1963) and horticulture is increasing (corn, hoe chips and farmsteads). There is some mound construction notably the Helena mounds at the south end of Crowley's Ridge (Ford 1963) indicating greater social complexity. Typical artifacts include Snyder, Steuben, Dickson and Waubesa projectile points, and an increasing number of pottery types (cf. Rolingson 1984; Phillips 1970; Morse and Morse 1983). In the late Woodland there is an apparent population explosion as evidenced by a great number of sites with plain grog tempered pottery in the east and Barnes sand tempered pottery in the west of the Central Valley (Morse and Morse 1983; Chapman 1980). There is some evidence of architecture (cf. Morse and Morse 1983; Spears 1978) in this period as well as mound center construction (Rolingson 1984). There are a number of large open sites which have not been excavated. There appears therefore to be a rather large bias in what we know about this important period toward the spectacular mound centers. There is still a great deal which is not understood

about the cultural sequence and changes which came about during this important period. The Late Woodland in this area has been suggested as the underlaying precursor to the Mississippian which came crashing into the area with the introduction (Invention ?; cf. Price and Price 1981) of shell tempered pottery and the introduction of the bow and arrow around A. D. 850.

The Mississippi period (A.D. 850-1673) is known from the earliest investigations in the region (Thomas 1894; Holmes 1903; Moore 1916), and still has been the most intensively investigated portion of the prehistoric record in northeast Arkansas and southeast Missouri (Chapman 1980; Morse and Morse 1983; Morse 1982; Morse 1981; House 1982). There has been enough work done that the spatial limits of phases have been defined (cf. Chapman 1980; Morse and Morse 1983; Morse 1981). During this period the native societies reached their height of development with fortified towns, organized warfare, more highly developed social organization, corn, bean and squash agriculture and extensive trade networks. The bow and arrow is common and there is a highly developed ceramic technology (cf. Lafferty 1977; Morse and Morse 1980; Smith 1978). This was abruptly terminated by the DeSoto entrada in the mid 16th century (Hudson 1984, 1985; Morse and Morse 1983) which probably passed through the project area.

Historic Period (1673-present). After the DeSoto expedition the area was not visited until the French opened the Mississippi valley in the last quarter of the 17th century. The Indian societies were a mere skeleton of their former glory and the population a fraction of those described by the DeSoto Chronicles.

During the French occupation most of the settlements were restricted to the major river courses with trappers and hunters living isolated lives in the head waters of the many smaller creeks and rivers. The St. Francis River was one of the earliest explored tributaries of the Mississippi River in the Lower Mississippi Valley and appears on some of the earliest French maps (Figure 8).

The Euro-American occupation proceeded overland down Crowley's Ridge spreading out from the rivers. Ports were established at Piggott on the high ground of Crowley's Ridge in the St. Francis Gap in 1835. It was located on the Helena-Wittsburg road which ran down Crowley's ridge (Dekin et al 1978:358). All of the settlements in the 1830's between Piggott and Helena in the St. Francis Basin were either along the rivers or on Crowley's Ridge. Towns continued to be founded in these environments into the early 1900's. Settlements away from the rivers along overland roads began in the 1850's and greatly accelerated with the construction of the railroads, levees and drainage ditches in the late 19th century.

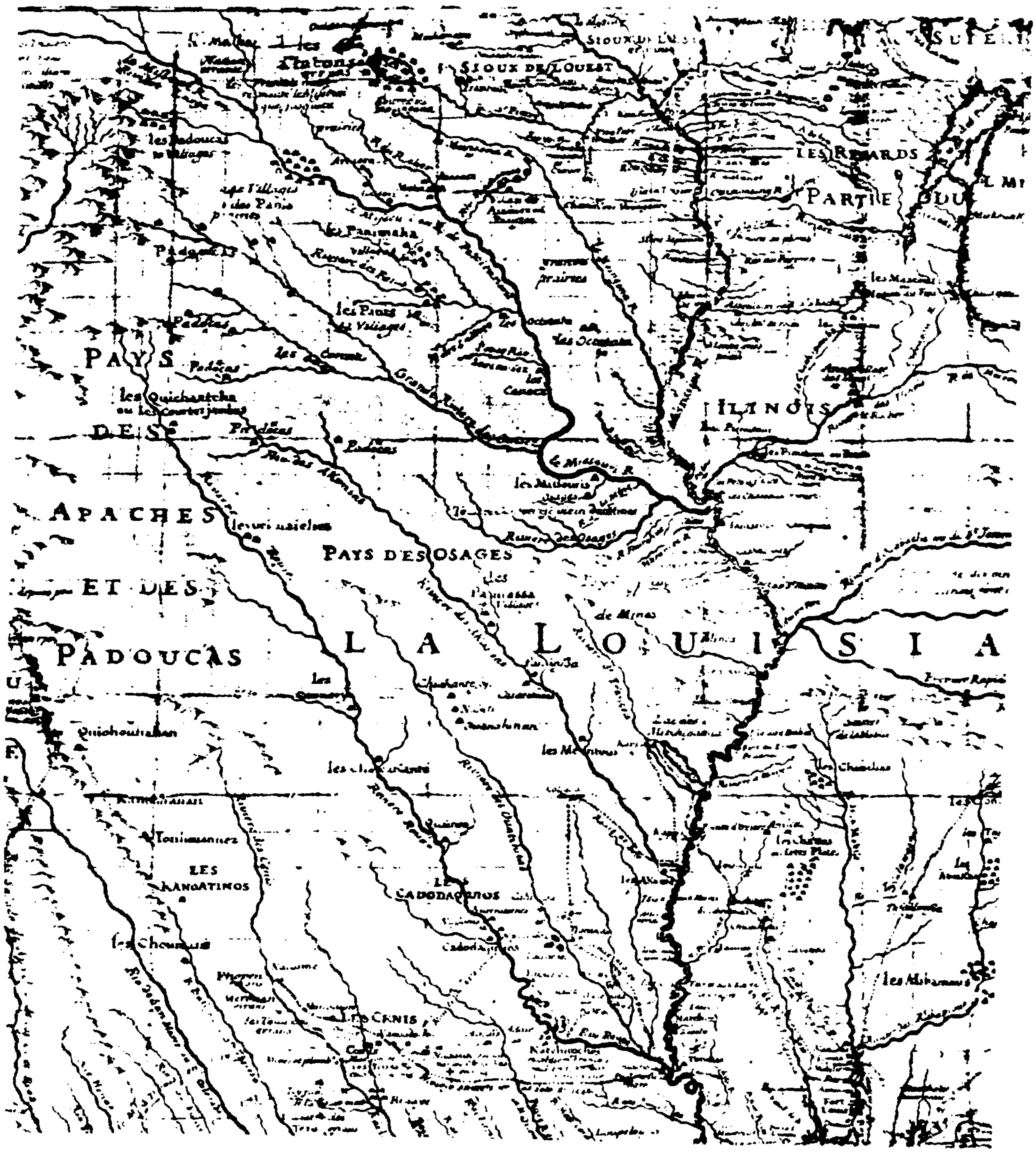


Figure 8. Map of Louisiana and the Course of the Mississippi by Guillaume Delisle, May 1718. (After Tucker 1942: Plate XV)

PREDICTIVE MODELS IN ARCHEOLOGY

The use of predictive models and many of the underlying assumptions are rooted in settlement analysis dating back to Willey's classic study in the Viru Valley, Peru (Willey 1953). In this study, Willey traced the changes in settlement types and locations through several thousand years of prehistory. In a sense, these were the beginning of predictive models because certain properties of types of sites were identified. However in actuality they were statements of empirical observation.

Since that pioneering work, settlement analysis has become an integral part of archeology (Chang 1958; Kurjack 1974; Harn 1971; Munson 1971; Adams 1965),and in more recent times have included analyses of the settlement systems often in conjunction with ecological systems (Muller 1978; Kurjack 1974; Peebles 1971; Smith 1978; Ward 1965; Winters 1969; Lewis 1974). These studies mark the beginning of establishing systematic relationships between archeological sites and particular environmental features such as levee soils, ecotones, and rivers.

In the 1970's, as a part of the "New Archeology" movement, attention has been paid to the factors which cause the perceived structures in the settlement systems (Gummerman 1971). Most of these analyses have involved making the Mini-Max assumption - people live where they can get maximum returns for minimum input - derived from Zipf's (1949) principal of least effort. This and other methods and approaches were borrowed from geographers who had developed and continue to work with important methods of locational analysis (Chisolm 1970; Dacey 1966; Morrill 1962, 1968; Vining 1955) and explanatory theories (Bylund 1960; Christaller 1966, original 1933) for over a half century.

Locational analysis has been of critical importance in the formation of many of the concepts used in this study. There were several applications of the locational properties derived from geography utilized in archeological analysis (Crumley 1976; Lafferty 1977; Marcus 1973; Steponaitis 1978;. . .) and site catchment analysis (Lafferty and Solis 1979; Peebles 1978; Roper 1974, 1975, 1979; Morse 1981). These studies, both successes and failures, have lead to a refinement of the methods and underlying theory.

Along with a growing awareness that archeological sites are situated in particular kinds of environments, came the plotting of densities of archeological sites by ecozones in settlement pattern research (Gummerman 1969; Plog 1974) and in Cultural Resources Management studies (Mueller 1974; Schiffer and House 1975). The realization that these densities varied in different ecozones led to the premise that if settlement models could be developed by surveying only a sample of a project area, then on large land modifying projects such as reservoirs and strip mines, a great deal of time, money and human energy could be saved. Several projects utilized this approach (Klinger 1976) but were

generally found to be unsuccessful. The best applications occurred, except for more restricted kinds of projects, where one simply had to identify environments where sites do not occur (Price and Price 1980) and recommended placement of the powerline or pipeline accordingly. The major problems with this approach were that the methods did not allow for the specificity that was required and in general the approach was too simplistic.

The current generation of models was developed from a synthesis of previous work (Lafferty 1977; Lafferty and Solis 1979; Limp 1978 and 1981) to construct practical models used to predict site locations over large surfaces for cultural resources management purposes (Lafferty et al 1981, 1984; Lafferty and House 1984; Hay et al 1982). This approach makes assumptions of Rational Choice optimization theory (Arrow 1950, Limp, Lafferty and Scholtz 1981). These assumptions involve a more complex interrelationship of variation than was possible with less sophisticated Mini-Max assumption (Limp 1980), and includes the recognition that different classes of human settlement are dependent on different kinds of variables (Lafferty 1980). Also there is the increasing sophistication of the statistics being employed which more closely approximate the reality of a complex environment.

Regression analysis was seen as a means of modeling the complex environments and their relation to archeological sites. These attempts also had several problems. The first of these was the use of the archeological sites as the unit of analysis (Lafferty and Solis 1979). This was the normal procedure in settlement analysis, but it left the investigator not knowing what the characteristics were of the locations without sites. How many locations were there with the same characteristics of where sites were located which did not have archeological sites? This and other questions have important implications for how full the landscape was and other questions of theoretical importance. From a management point of view these models failed because they could not be applied to the unsurveyed portions of the project area (Lafferty and Solis 1979).

The desirability of encoding variables for an entire project area by some spatially controlled unit finally became apparent to several investigators (Lafferty and Solis 1979; Limp 1980, 1981; Limp, Lafferty and Scholtz 1981; Hay et al 1982). The implications of measuring environmental variation for the entire project area (statistical universe) are several and just beginning to be understood. One important implication is that survey bias can now be precisely measured (Lafferty 1981:164-191). This is giving rise to new statistical applications to more precisely measure the goodness of fit of different variable distribution curves (Parker 1984; Lafferty 1984). Encoding the whole universe also allows for a precise application of the developed model to the whole universe (Lafferty et al 1981, 1984; Lafferty and House 1984; Hay et al 1982). The ongoing application of Geophysical Information Systems to this kind of predictive modeling is about to make the generation of the grids much less time consuming and will lead to an optimization of analysis unit size for different

analyses and regions.

The early uses of regression analysis in settlement pattern analysis was accomplished to predict site size (Lafferty 1977) or the size of public investment in certain monuments (Stephonitis 1978). In the field, particularly in the wooded east, it was often impossible to determine site size and linear regression analysis really was not the proper statistic. The Sparta predictive model made the first application of Multivariate Logistic Regression (Dunn n.d.; Scholtz 1980, 1981) which predicts a probability that an event will happen. This places the normal regression formula in an exponent in the denominator and results in a probability that there will be a site on a given unit of land. A less satisfactory solution has been to make the predicted variable be a percent of shovel tests with archeological materials (Hay et al 1982).

To date, the development of predictive models over the past 35 years has resulted in delimiting a successful, statistically adequate, set of procedures for predicting site locations which are theoretically adequate. At the present time, the two tests which have been made of the theory have failed to disconfirm it (Lafferty 1977; Lafferty and House 1984).

The development of predictive models over the past 15 years has resulted in several procedures and approaches which to date have been successful. Basic requirements for predictive models include: 1) a grid laid over the project area for spatial control with standard sized Units of Analysis; (2) a representative sample of the project area is surveyed (Statistically it is desirable that more than 30 units have sites in them); (3) a selection of variables which influence settlement in the environment is made; (4) the set of variables is input into the computer matrix for each Unit of Analysis; (5) an analysis of variable matrix for redundancy using factor analysis and/or correlation coefficients; (6) an application of logistic regression to develop a model of site probabilities; and (7) the application of the model to the unsurveyed universe to map probabilities which can then be used to guide further survey and project goals.

PREDICTIVE MODELS IN THE CENTRAL MISSISSIPPI VALLEY

There has in fact been more predictive modeling work done in this basin than anywhere else in the southeast. There have been three predictive models developed in the St. Francis Basin which are directly relevant to our analysis.

The first was the monumental effort carried out by Iroquois Reasearch Institute (IRI): <u>Predicting Cultural Resources in the St. Francis River Basin: A Research Design</u> (Dekin et al 1978). This study which included the whole basin, outlined the known data base, defined major environmental variation, and outlined what kinds of data are required to develop a predictive model in the basin as a whole. Various correlations were drawn between

various physiographic features such as distance to water and depositional environments/soils. While backswamps were found to have the lowest density of sites, the density of components is erroneously derived by dividing the number of known components per physiographic zone by the total area in that zone, rather than the area surveyed (Dekin et al 1978:94-108). This results in a much lower estimate of site densities than have been found on other surveys and brings out the problems of areal control when using archival data where the area surveyed is not known. Over 2/3 of the sites came from meander belts and Relict Braided Surface locations (2268/3,113) while almost no sites are known from Backwater swamps (9/3,113). The area surveyed in obtaining these results is not known and, therefore, the densities given for the different zones have no meaning (Dekin et al 1978:94 and 108). While the densities are erroneous as confirmed by later work, the relative tendencies for more sites to be located on the IRI high density areas has been confirmed by later work.

In 1979 Price carried out a survey of the Missouri-Arkansas Power line and then developed a model which predicted that the least probable location for sites were on slackwater soils (Price and Price 1980). This model was used in the final planning of the power line in Missouri.

Between 1983 and 1985 Mid-Continental Research Associates conducted cultural resources survey over 95 miles of ditches in the Tyronza Basin for the Soil Conservation Service (Lafferty et al 1984, 1985). This was a scientifically drawn statistical sample which predicted the specific probability that there would be a site on each 10 acre (4 ha) unit of the project area. This model is directly applicable to the present project area. This model used logistic regression (Dunn n.d.) to model areal resources. The model (see more discussion in Chapter 6) predicts that sites are found on higher levee soils near water.

The analysis performed in this study draws on the results of the above works to develop some general statements concerning the distribution and expected number of sites in the project area.

CHAPTER 4

CULTURAL RESOURCE LITERATURE SEARCH

by Donald S. Warden

INTRODUCTION

The area of greatest concern in this project as defined in the scope of work (Appendix A) is a strip 1000 feet wide measured from the center of the levee, along parts of both the east and west sides of the St. Francis Sunklands and the west side of the Little River. The total project area is about 82.8 miles long, 63.3 along the St. Francis and the other 19.5 along the Little River. Along the St. Francis, 17 miles lie on the west side, entirely in Clay County, Arkansas, while 46.3 miles are on the east side, 20.3 in Dunklin County, Missouri and the rest in Craighead and Poinsett Counties, Arkansas.

Improvements along the west side of Little River are entirely in Mississippi County, Arkansas. All improvements are to the outermost presently existing levee in the areas affected.

In this chapter we first discuss our use of records related to known sites in Arkansas and Missouri. Then we correlate this information on site discovery methods, site characteristics and underlying soils and the characteristics of project locations not known to contain sites. This will enable us to determine the feasibility of a "Tyronza-like" predictive model in the project area.

METHODS

The first step in the literature search was to examine the quadrangle maps of site locations maintained by the Arkansas Archeological Survey (AAS) at Fayetteville. Twenty five sites were found to be either partially or entirely within the Arkansas project area; an additional 14 sites were very near the project area (within 2000 feet of the center of the levee);. and another eight were on the opposite side of the levee from the project (Table 7). The later two categories were noted since, due to the vagaries inherent in the determination of site boundaries, they could extend into the project area, and their presence should be known to any archeological survey carried out in conjunction with this project.

As a cross check, General Land Office Maps, surveyed in this area between 1845 and 1848, were examined for the presence of structures and fields in the project area. None were found that had not already been plotted by the AAS as sites.

The site files maintained by the Missouri Archeological Survey and the Office of Historic Preservation of Missouri were consulted on September 12 and 13. Most site locations are stored on a computer system, rather than plotted on quadrangle maps, as in Arkansas. Only a few sites are plotted on a quadrangle map. A

search was made for sites within the specified Section, Township and Ranges, as well as sites which were in multiple Sections, and those which would have been plotted on the Land Grants Maps. There were no sites plotted on multiple Sections, and none found in the Land Grants file. Seven sites were located in the Missouri sections. Five were partially or entirely within the project area, one between 1000 and 2000 feet from the center of the levee, and one from immediately on the other side of the levee (Talbe 7).

Several sites in the Missouri site files for the project area were recorded by the Lower Mississippi Valley Survey (LMVS) (Phillips, Ford, and Griffin 1951, Phillips 1970). With one exception, no names were recorded for these sites, nor was the Phillips (1970) number recorded. In order to tie into the site and phase information recorded in these published sources, we worked from the plotted location of the named site (Wilkins Island Site: 8-P-1;23DU5) on the Phillips (1970) map and a quadrangle map. Rough measurements were made on the Phillips (1970) map to other sites, and these distances related to LMVS sites with modern numbers and legal descriptions from the Missouri site files. These correlations were later checked against the information in Williams (1954), which seems to have been the source for the legal descriptions of these sites. The system of correlation between the site files and Phillips (1970) proved to work perfectly.

Once all recorded site locations in and near the project area had been determined, Soil Conservation Service (SCS) soils maps for each county were consulted to determine the soil types underlying these sites. For the Arkansas sites, the approximate percentages of each soil type within the recorded site boundaries were determined; soil percentages on the Missouri sites were determined for the smallest area the site location could be narrowed down to - eg. east of the levee and ditch in the NW 1/4 of Section X. A problem in this approach is that the soil map sometimes does not agree with the investigators' description of the soils on the site. This problem is not unexpected since the soils maps were made for general land use planning. Often there are small patches of soil which are not distinguished in mapping. Some of the mapped units such as the Dundee-Dubbs Crevasses associations are a mosaic of poorly to well drained soils. Other units like Sharkey clay may have isolated patches of better drained soils as large as an acre (cf. Ferguson 1979:3).

Table 7. Sites Recorded in or around Project Area

In Project Area (n=30)	1000 feet beyond Project; same side of levee (n=15)	Immediately other side of levee from project (n=9)
3CG1	3CG318	3CG28
3CG494	3CG495	3CG317
3CG500	3CG496	3CG637
3CG553	3CG497	3MS19
3CG554	3CG556	3MS20
3CG555	3CG903	3MS25
3CG557	3MS45	3MS87
3CG607	3MS125	3MS208
3CG614	3MS128	23DU14
3CG615	3MS129	
3CG616	3MS131	
3CG636	3MS132	
3CG713	3MS134	
3MS21	3MS197	
3MS43	23DU2	
3MS49		
3MS93		
3MS119		
3MS133		
3MS135		
3MS136		
3MS199		
3MS211		
3MS212		
3MS318		
23DU5		
23DU12		
23DU13		
23DU28		
23DU50		

Sixteen of the sites in the Project Area are single component sites. Twelve of these are Historic, two are Mississippian and two are Woodland. There are fourteen multiple component sites. Nine of these have Woodland and Mississippian components. Three have Woodland, Mississippian, and Historic components and one site has Archaic, Woodland, Mississippian and Historic components. Looked at another way, there are 16 Historic components, 15 Mississippian components, 17 Woodland, and 1 Archaic component in the project area. This is a total of 49 components on 30 sites or an average of 1.63 components per site.

Table 8. Site Environment from Soil Maps and Site Forms

Environment	Total # of Sites in Environment (soils map)	Precisely Located, more than 1 artifact	Site Form says Sandy Knoll or Ridge
High parts of Levee	7	6	3
Lower parts of Levee	27	17	9
General Levee or Ridge	11	9	2
Subtotal	45	32	14
Slack Water	9	6	4
Total	54	38	18

SOILS AND SITE LOCATION

Table 8 shows the differences between environment as shown by soil maps and by the site form, controlling for the quality of the site and of the locational information. In the first column the environment of each site was determined using published soils maps only. The vast majority (83%) of sites are on levee soils, with most of these sites occurring on lower levee soils. However, a disturbingly large percentage (17%) of sites occur on slack water soils. Based on the soils maps we would predict that these locations would not contain sites. When isolated finds, sites with late historic trash only, and sites whose map locations are probably only approximate (mostly GLO sites) are removed from consideration (column 2) the "real" percentage of site locations not predicted from the soil map remains high at 16%. The third column shows the numbers of sites from column 2 whose site forms say the site is on a sandy knoll or ridge.

Only 44% of the sites from column 2 whose locations are shown on the soil map as having levee soils are described on the site form as having levee soils. In no case, however, did the site form specify slackwater soil for a location where the soil map showed levee soil. The opposite is not true. Four of the six "real" site locations shown on the soil map as on slackwater soil

are described on the site form as on a sandy knoll or ridge. These are the situations mentioned above where the soils map did not indicate small patches of higher, better drained soils not significant for modern, general land use planning which were large enough for some prehistoric or early historic use.

The two remaining sites apparently definitely on slackwater soils are both low density scatters. One is known only from "a few chipped stone artifacts" (3CG317). The other site (3CG713) had deposits from the Late Woodland, Mississippian, and 1880-1930 time periods, but they were limited to the 13cm thick plowzone.

Of the four sites shown on the soils map as on slackwater soil, but described on the site form as on levee soils, only one (25%) was larger than a low density scatter. This compares with 60% of the sites shown on the soil map as on levee soil which were larger than small scatters. This reflects the common sense deduction that larger sites must be on larger patches of soil, which are more likely to be indicated on a soil map.

This exercise has shown that, based on known site locations, a predictive model based entirely on soils as designated in published soils books would fail to predict the 16.6% of sites on slackwater soils. But only one site (11%) of slackwater soil sites is larger than a low density scatter and so potentially eligible to the National Register.

Thus 84% of the previously recorded precisely located sites, not isolated finds, in the area of this project could have been predicted from published soil maps alone. That is, soil indicated environments apparently had a very powerful effect on the way people utilized the available pre-drainage landscape. To further evaluate this assertion we must examine the abundance of levee soils across the total environment. For this purpose, Township and Range system sections were used as the unit of analysis. For each section in the project area, the relative proportions of each soil type within the project area and within the section were estimated.

The Dunklin County project area sites were in sections having at least 80% levee soils inside the project area (Table 9). Ninety-six percent of the recorded sites in the Mississippi County project area were also in counties with at least 80% levee soils (Table 10). The picture is much less clear regarding Craighead County(Table 11). Only one site was recorded in the sections with at least 80% levee soils. The only clear trend is that almost all sites occur in sections with at least some levee soil.

To derive meaning from these numbers we must compare them to the numbers of sections containing levee soils. In Dunklin County 48% of the sections in the project area have 80% or more levee soil, compared to 65% of Mississippi County sections. This contrasts sharply with the 14% of Craighead County sections having 80% or more levee soil.

These results demonstrate that more abundant soils can contain more sites, but also show that people preferentially chose to live in sections containing high proportions of levee soils. In Dunklin County in 15 (52%) of the sections there are no known sites. In Mississippi County among 9 (35%) of the sections there is 1 site (4% of the total number of sites) and in Craighead County spread among 34% of the sections are 9% of the sites (2). Thus soil also predicts where sites do not exist.

As a final comparison, we will examine the proportions of soils in counties with no recorded sites within the project area. Only a small amount of the project area enters Poinsett County, but there is a large amount of the project in Clay County.

Two of the three sections in the project in Poinsett County have at least 80% levee soils (Table 12). These two sections should have a high probability of containing sites. Only 3 (13%) of the section in Clay County contain at least 80% levee soil (Table 13). Another 13 sections (59%) contain at least some levee soil and so have a fair probability of containing sites.

In Chapter 5 we briefly discuss the locations and methods of archeological survey projects in the project area, which will give us the final information needed to make a good prediction of actual site frequencies in the project area.

Table 9. Levee Soils and Project Area Sites in Dunklin County, Missouri

Proportion of Levee soils	Number of Sections with (n=29)	Number of Known Sites (n=7)
100%	5	2
95%	0	0
90%	0	0
85%	6	2
80%	3	3
75%	1	0
70%	5	0
65%	2	0
60%	3	0
45%	1	0
40%	1	0
0%	2	0

Table 10. Levee Soils and Project Area Sites in Mississippi County, Arkansas

Proportion of Levee soils	Number of Sections with (n=26)	Number of Known Sites (n=25)
100%	11	19
95%	3	1
90%	2	3
80%	1	1
<80%	9	1

Table 11. Levee Soils and Project Area Sites in Craighead County, Arkansas

Proportion of Levee soils	Number of Sections with (n=29)	Number of Known Sites (n=22)
100%	1	1
95%	2	0
90%	1	0
60%	1	2
50%	3	6
30%	4	5
20%	2	1
15%	2	1
10%	3	4
<10%	10	2

Table 12. Levee Soils and Project Area Sites in Poinsett County, Arkansas

Proportion of Levee soils	Number of Sections with (n=3)	Number of Known Sites (n=0)
100%	1	0
85%	1	0
30%	1	0

Table 13. Levee Soils and Project Area Sites in Clay County, Arkansas

Proportion of Levee soils	Number of Sections with (n=22)	Number of Known Sites (n=0)
100%	1	0
95%	1	0
85%	1	0
60%	2	0
55-50%	3	0
45-40%	4	0
35-30%	1	0
20%	1	0
<20%	2	0
0%	6	

CHAPTER 5

PREVIOUS SURVEYS, ESTIMATED SITE DENSITIES AND THE GENERAL NATURE OF SITES

by Donald S. Warden

INTRODUCTION

Attempts to derive a predictive model from any given data set must always be tempered with a knowledge of the quality and possible biases of that data set. In the present discussion we are limited by where various people have looked for sites, ranging from amateurs with relatively free rein to look where they will, with no control over where they looked; to a narrow power line survey crossing many different environments. A very important ingredient in developing a predictive model is knowing not only what the characteristics are of locations with sites but also the characteristics of locations known not to have sites.

THE NATURE OF PREVIOUS SURVEYS IN THE PROJECT AREA

Missouri Data Base

It will be noted that all the site numbers in or near the portions of the project in Dunklin County, Missouri, are very low. A review of literature related to Dunklin County, conducted by Ms. Hess while in Missouri, revealed that many archeological projects have been conducted in Dunklin County, but many of these were related to improvements in the town of Kennett, and many others were for ditch improvements or supply lines far from the St. Francis River. Thus, all the known sites in the project area in Dunklin County, Missouri, were discovered before or shortly after the inception of the Missouri site file system.

As in Arkansas, many of the known sites in Missouri have been discovered and recorded by avocational archeologists. Interestingly, two of the three avocational archeologists who reported sites in the project area in Missouri also reported sites in the project area in Craighead County, Arkansas.

As part of his dissertation research, Stephen Williams (1954) conducted a site survey in Southeast Missouri and Northeast Arkansas. He then combined his data with that in museum and private collections and wrote definitions of several Barnes and Mississippi Period phases which still form the basis for phase definitions in the area today (Morse and Morse 1983:27).

Because ceramics are the most common artifacts on the surfaces of sites in the Central Mississippi Valley, Williams' field work and phase definitions concentrate on differences in the frequencies of pottery types on sites with abundant pottery sherds. That is, Williams was not trying to find every site in any specific area. He did, however, record three sites in or near the area of this project at which he conducted surface collections and excavated a few test units.

The Lower Mississippi Valley Archeological Survey began field work in 1940, intending especially to investigate pre-Mississippian cultures in the Mississippi Valley (Phillips, Ford, and Griffin 1951). The work from 1940 to 1947 in the southern part of the Mississippi Valley was published in 1951 (Phillips, Ford and Griffin 1951). It defined and seriated pottery types throughout the surveyed area and their general distributions across time and space for the entire pottery making period.

One of the authors of that volume continued work through 1955, concentrating his survey and excavation work in the Yazoo Basin (Phillips 1970). Phillips had become dissatisfied with general statements of the distribution of overly general types across time and space. He wanted to define types more restrictively and to place more emphasis on specific sites than the original survey had, thus allowing definition of phases. When Phillips published this work in 1970 he also pulled together archeological work by various people throughout the Central Mississippi Valley, including Williams. Phillips refined and clarified ceramic type definitions throughout the Mississippi Valley and used frequencies of these pottery types over time and space to define phases for the entire pottery making period in the Mississippi Valley. Besides the sites recorded by Williams, Phillips (1970) refers to one other site in or near this project (23DU14).

Arkansas Data Base

Eighteen of the sites recorded by the Arkansas Archeological Survey for this project area were reported by avocational archeologists. Many of them reported several sites each, generally all in the same county.

The General Land Office first surveyed the project area between 1845 and 1848. These surveys are arranged by Township and Range and, along with the notes made by the surveyors, provide a valuable look at the area in the early historic period, before drainage. Additional surveys were conducted and appended to these surveys, primarily in the early 1900's, but extending to 1950. These supplements reflect changes in the landscape, primarily as a result of drainage.

The surveys of the 1840's simply left the area of the Sunk Lands blank. Presumably the surveyors felt no need to survey across an area no one could live in anyway. All this had changed by 1919: Mississippi River overflow had been cut off from enter-

ing the St. Francis Sunk Lands, and this area was then drained (Dew 1968). Before land sales began, GLO surveyors extended section lines into the drained area and noted on their supplements that the St. Francis Sunk Lands had been "erroneously omitted" from the original surveys.

In the original surveys, fields, houses and other buildings encountered while surveying section lines were sketched in on the map. Names were sometimes included. Many of these areas are near the St. Francis Sunk Lands and in fact 8 are in the present project area, while only one is near it. The edges of the fields on the GLO maps are aligned with the lines being surveyed. Since these lines did not exist when the fields were set up, the field boundaries are undoubledly not correct. This has significant bearing on the determination of the soils underlying sites (above). However, the one field check of a GLO site provides important confirmation of the general locations recorded. Thus, the surveyors seem to have accurately recorded the locations of fields and houses at points along the section lines, but just sketched in the borders off surveyed lines.

Brenda Keech of the Jonesboro station of the Arkansas Archeological Survey (AAS) has gone through several of the GLO maps related to northeast Arkansas and has recorded these locations in the state site file (Keech 1978). An independent review by this project showed no omissions regarding the project area.

A long term objective of the Jonesboro Station of the AAS is to intensively survey a corridor 1/4 mile (.40 km) wide between the Mississippi River and the Ozarks (Morse and Morse 1983:35). The fifteen miles (24km) of this transect between the shore of Big Lake and the St. Francis River, (the Big Lake Transect (BLT)) were surveyed by ASU students volunteering 3 days of the March 1976 spring break. According to the Morses' March is the very best time to look for sites in northeast Arkansas, so the BLT survey obtained the best sample of sites possible from pedestrian survey techniques.

In or near the area of the St. Francis Seepage Project, this survey found and recorded 14 locations with prehistoric and/or historic artifacts. Seven of these locations were within the current project area. That is seven sites in two areas only 1000 feet wide and a quarter of a mile long! Because this is the widest intensive survey of any part of the actual project area, we will devote greater attention to the characteristics of the area involved and the sites found.

Additionally, as part of their other duties, ASU station assistants recorded 2 sites near the project area. One is within one thousand feet of the project and the other is on the other side of the levee.

Field work for the AAS St. Francis II project was conducted in November and December of 1976 (Klinger and Mathis 1978). The project was an intensive survey of 3 areas in the St. Francis Basin, only one of which was near the current project area. This was a 12.2 mile (19.6 km) survey along Cockle Burr Slough ditch improvements (Dinwiddie in Klinger and Mathis 1978).

The intersection of the Cockle Burr Slough project and the current project is small and no sites were found there. Two sites were found on the other side of the levee from the current project, and one of these, the Mangrum Site (3CG636) is eligible for the National Register of Historic Places. The partial mitigation and burial of that site is discussed below. Neither site is known to extend into the area of the current project, but the project area near the Mangrum site should be extensively tested to be sure of this.

Work on the Arkansas Power and Light Company transmission line from Keo to Dell was conducted by the AAS in 1978, 1981 and 1982. Padgett (1978) conducted the original survey and recorded 3MS318 in the project area. Lafferty et al(1981) surveyed several route changes, and recorded 3MS713, also in the project area. He recommended further testing, which was done by Santeford (1982). The site proved to be no deeper than the plowzone and was judged to be not significant.

In 1979 Iroquois Research Institute conducted an intensive survey of the 20 acre area around the Ditch 81 control structure adjacent to the Big Lake National Wildlife Refuge in Mississippi County, Arkansas (LeeDecker 1980). They found no new sites, but subsequently investigated damage to 3MS93.

Site Density Prediction

Our discussion of previous archeological work in or near the project area demonstrated how little is known regarding the density of sites possible in the project area. No intensive surveys have ever been conducted along long stretches of the project area. A few projects have crossed the area, but only the BLT survey intensively surveyed a readily measurable portion of the project area itself. Each end of the BLT Survey was in a part of the current project, so two areas 1000 feet wide by 1/4 mile long were surveyed. By examining the number and characteristics of sites in these small samples of the project area and the soil characteristics of the sections, we hope to predict the total site density possible in the whole project.

At the Big Lake end of the BLT survey two sites were in the area of our project, but six sites were within 1000 feet of the project area. This reflects the fact that site density is greater along the BLT transect immediately outside the project area. Perhaps ditch and levee construction activities prior to the passage of cultural resource protection laws have already destroyed several sites in the project area. One of the two sites

in the project area is a small Barnes scatter. The other site also contains a small Barnes component, as well as possible late 19th Century items and 20th Century items. If the 19th Century items are correctly identified, they confirm the location of a OLD "field". The 20th Century items are probably from a house appearing on the 1941 quadrangle map.

The mile of project area in this section was characterized as having 100% levee soils. Therefore, multiplying the two sites found in the intensively surveyed 1/4 mile portion of the project by 4, we would would expect 8 sites in the project area in this section. Multiplying the number of components by four, we predict 16 components per section. If we make separate predictions for prehistoric and historic components we get 8 prehistoric components and 8 historic components.

At the St. Francis River end of the transect there are four sites in the project area and only one additional site near the project area. Within the project are two historic house scatters, no dates estimated, an isolated Mississippian point and a Barnes scatter. Ignoring the isolated find, we still have three sites in a 1000 foot by quarter mile area. Therefore 12 sites are predicted per section. Since each known site is single component, 12 components are also predicted, 8 historic and 4 prehistoric.

The project area in the section where these sites are located is characterized as only 53% levee soils. Thus, we predict the same number of historic components for sections with 100% levee soils in the project area and those with only 53%. However, we predict 8 prehistoric components for sections with 100% levee soils and half that number for those with half as much levee soil. That is, on the basis of an intensive surface survey, soils alone predict the density of prehistoric components far better than they predict the density of historic components. This is consistent with findings elsewhere in the Mississippi Valley. In the Tyronza Watershed Project Historic Sites were not predictable on the basis of biophysical data (Lafferty et al 1984, 1985) nor were they in the Sparta Mine Area in southern Arkansas (Lafferty et al 1981; Lafferty and House 1985).

Thus, the number of prehistoric components is directly proportional to the percentage of levee soils covering the project area. Table 14 combines the separate tables for each county (Tables 3-7) and predicts the total number of prehistoric components in the project area (column 3). We computed this column by multiplying the percentage of levee soils (column 1) by 8, which gives the number of prehistoric components per section. Multiplying this number by the number of sections (column 2) gives the total number of components predicted to be in those sections. For comparison, column 4 shows the number of known prehistoric components in these sections. The average number of components per site is 1.6. Dividing the 465 components by 1.6 results in a projected site density of 290 prehistoric sites in the project area. It should be emphasized that this method of computation,

yields too high an estimate. This is because there is not a full mile of project area in all sections.

Table 14. Prehistoric Component Density Prediction

Proportion of Levee Soils (percentage)	Number of Sections	Number of Components Predicted	Number of Components Known
100	19	152	5
95	6	46	0
90	3	22	5
85	8	54	2
80	4	26	5
75	1	6	0
70	5	28	0
65	2	10	0
60	6	29	2
50	7	28	2
40	8	26	0
30	7	17	4
20	3	5	0
(20	9	1-14	5
(1	20	(2	0
Total	108	465	30

Since the number of historic components does not vary with the percentage of levee soil in the section, and because there are maps dating to the maximum occupation period for the whole project area, we used these maps to identify the likely locations of historic sites based on mapped structures. Most of these appear to be tenant houses built at the end of roads near the levee. Many of these roads have ceased to exist and the once humble abodes now are sites. There are 74 locations which have a high potential for historic sites. Most of these locations have more than one structure shown on the map. Only two of these locations have previously identified sites. There is a high probability that there are at least 364 (290+74) sites in the project area of which 334 are not identified.

Even allowing for the exaggeration in our procedure, noted above, for estimating site density, there are probably 10 times as many sites in the project area as are now recorded. Obviously, many of these sites are not significant according to National Register of Historic Places criteria. However, the discussion

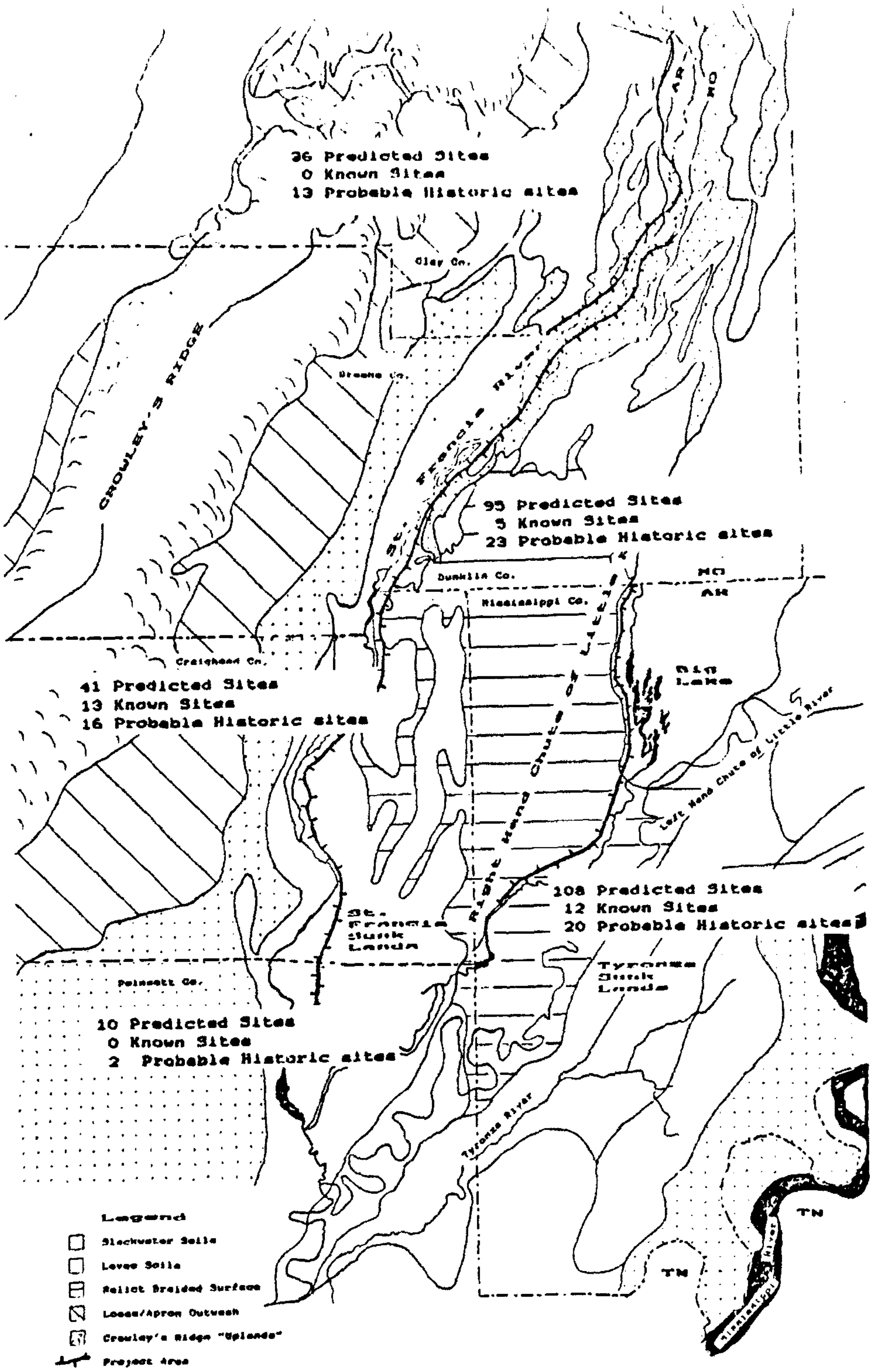


Figure 9. Systematic Archeological Survey, Sites and Predicted Site Densitities in the Project Area

below of known, large sites indicates that portions of significant sites are known to remain within the project area, and suggest that unknown significant sites probably exist. It is impossible to predict how many significant sites may still exist in the project area. But past excavations in and near the project area indicate that important floral, faunal and human remains requiring careful recovery and analysis are preserved in the area, as well as burned features yielding carbon and fired clay samples important for establishing a more precise absolute chronology for the region.

THE NATURE OF SITES IN THE PROJECT AREA

The only work which has been done directly in the project area over which there is any areal control are the BLT and the AP&L Surveys. The former has the advantage of containing an area in the project area, while the latter was a line across it. The BLT is, therefore, the basis we used to compute site densities in the project area.

Three major site excavations have been conducted on sites in (3CG1 & 3CG636) or very near (3MS20) the project area. The character of these sites is probably representative of many of the sites in the project area. This work is briefly described below.

3CG636-Mangrum

Limited testing by the St. Francis II project (Klinger and Mathis 1978) demonstrated the eligibility of this site for inclusion in the National Register of Historic Places (Klinger 1982). The mitigation plan agreed upon required more extensive testing between the east bank of the slough and the levee, where cultural material was less dense, in anticipation of moving the ditch improvements entirely to that side. Further erosion of the west bank would be prevented by the installation of rip rap and more of the site would be buried under a spoil bank.

Klinger (1982) estimates that about 80% of the site (9 acres) was left undisturbed by any excavation. The densest part of the remaining site extends under the west levee and into the Sunk Lands. A narrow strip of site may still exist at the new east bank of the ditch. No tests were ever made east of the east levee, in the area of the current project. This area was under cultivation when the site was discovered (Cochran in Klinger 1982). However, the record of stratigraphy and artifact associations in the backhoe trenches near the east levee (Klinger 1982, Appendix H) indicated that, while the midden was difficult to define in this region, artifacts and features were found. The site certainly extends under the east levee and may exist beyond the levee, in the St. Francis Seepage Project area. If this project proceeds to the field testing phase, the area near the Mangrum site should be carefully checked for cultural deposits.

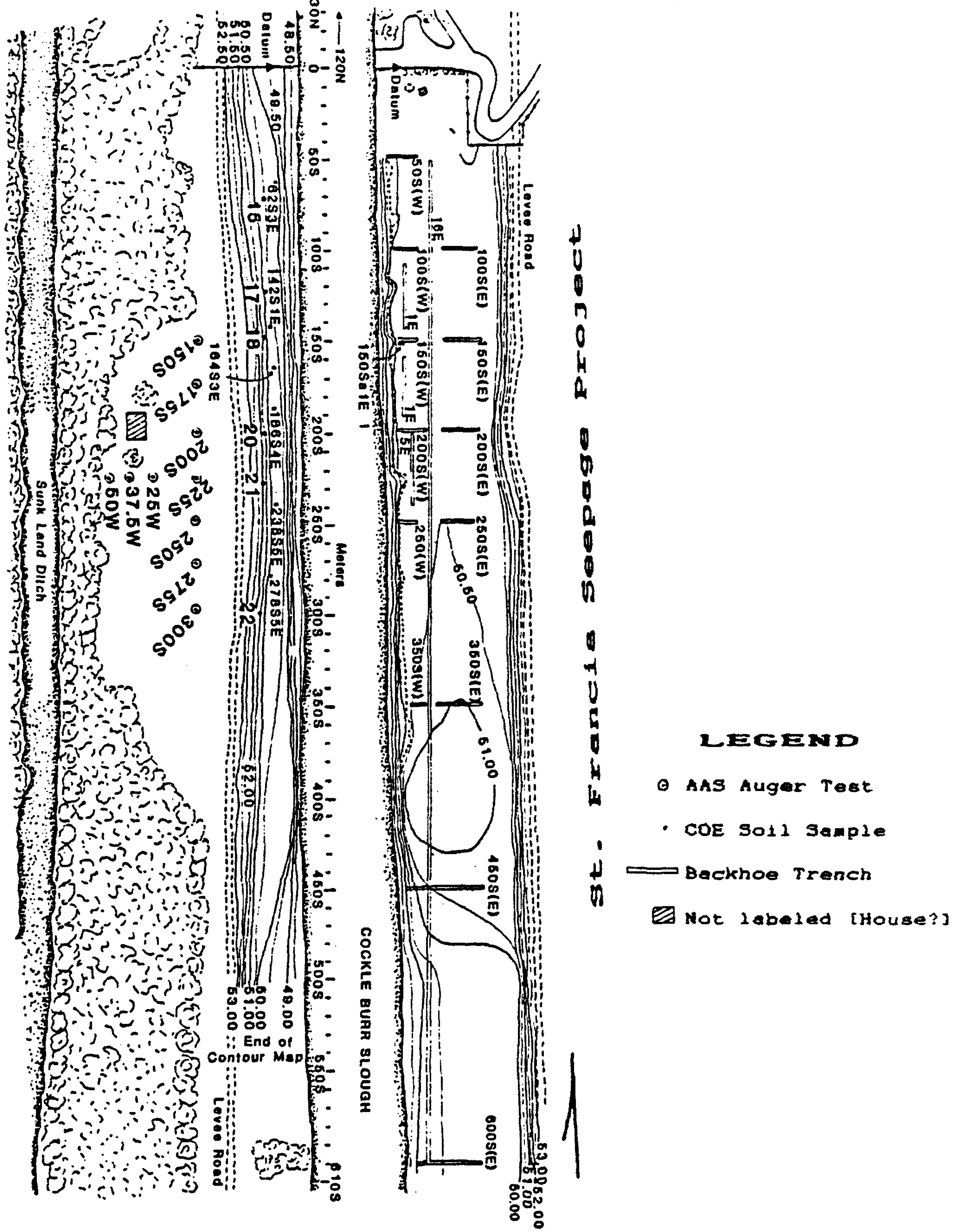


Figure 10. The Mangrum Site and the Project Area (After Klinger 1982).

3CG1 (9-0-4)

The Lawhorn site (3CG1, 9-0-4) was found by an avocational archeologist, John Moselage, in 1956. This was 11 years before the founding of the AAS. Mr. Moselage wanted to excavate the site, so he enlisted the help of a prominent Missouri archeologist, Carl Chapman. Working on weekends and holidays, with frequent consultations with Dr. Chapman, Mr. Moselage and several helpers excavated portions of the site and reported their findings (Moselage 1962).

A hard packed, clean plaza area was identified. North of this was evidence of considerable house building, but only two, overlapped, houses were excavated. At this point the midden was 1.5 to 1.8 feet thick below the plowzone. The midden was at its thickest (2.2 feet below the plowzone) at the levee in the northern part of the site. Features uncovered in the midden contained important carbonized food remains. Three radiocarbon samples were taken, one from the midden and one from each structure. There were also 35 fairly complete human burials in this part of the site.

The main component at Lawhorn is Mississippian. The Morses (1983:253) suggest that this component may be in the same phase as the Middle Mississippian component at Zebree (3MS20, discussed below).

In 1962 the southern part of the site had already been washed away by a St. Francis River meander. A drainage ditch had been cut through the site and a levee piled on the site. The area was in cultivation while Moselage excavated, and cultivation has probably continued. Although much of the site was left unexcavated, this plowing has undoubtedly damaged it. Pot hunting activities have probably also continued to damage the site. But, considering the depth of the midden, the odds that deposits of National Register quality remain are high, and we recommend extensive testing of this area before any projects are undertaken.

3MS20-Zebree

The excavations at the Zebree site (3MS20) are of far ranging importance for several reasons. Phases of the investigation spanned an adequate time to allow complete lab work and formulation of test hypotheses between phases, so that a wideranging, multidisciplinary approach could be planned. The different phases of work had different goals and so used different excavation techniques, some traditional and some new, allowing cross checks on the qualitiy of data recovered for the time and labor expended. This formed the basis for one of the three masters theses resulting from work at Zebree (Anderson 1979).

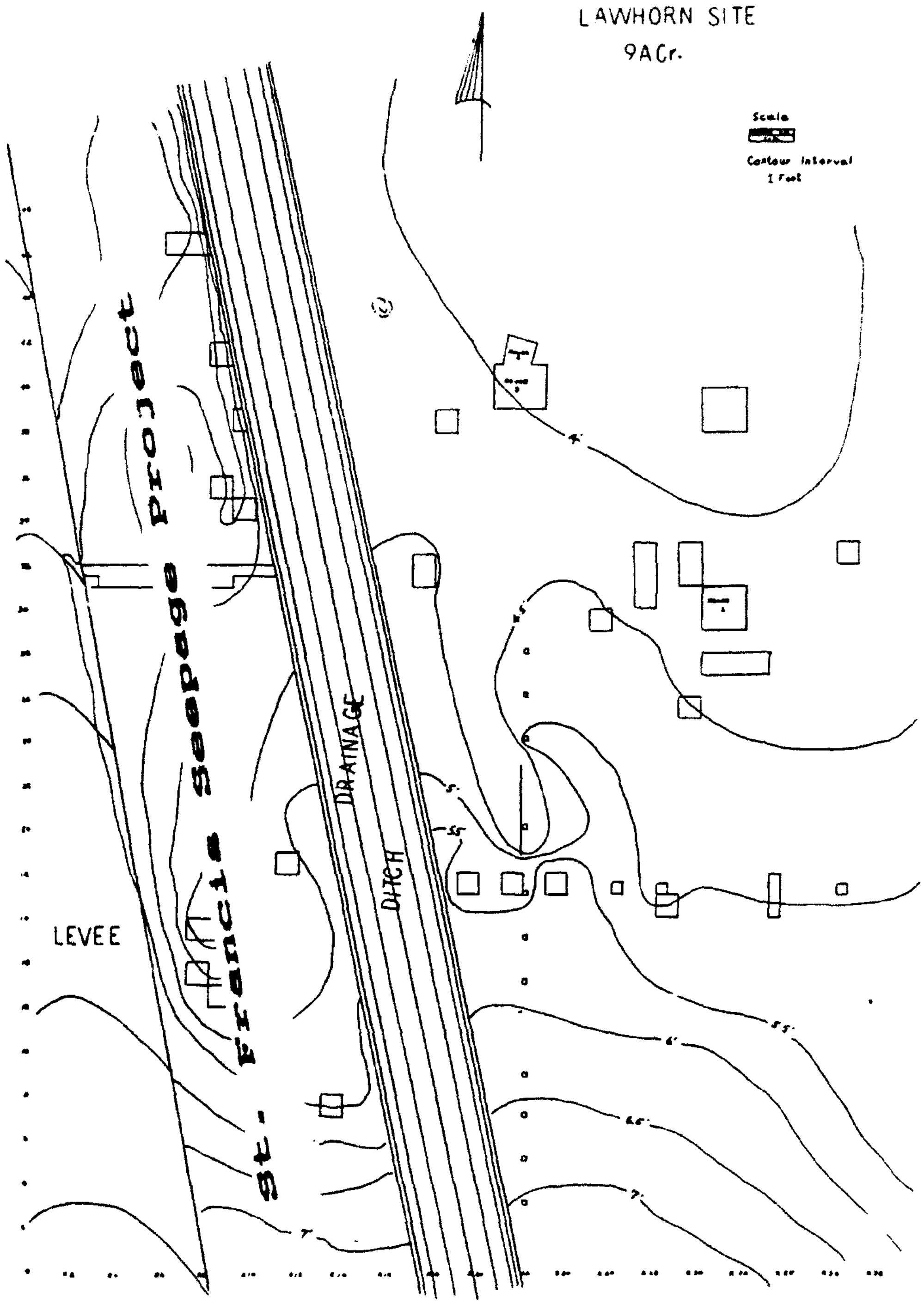


Figure 11. The Lawhorn Site and the Project Area (After Moselage 1962).

All of these accomplishments were possible because the archeological deposits at Zebree were deep, stratified and undisturbed, and were discovered quite a while before their actual destruction. These deposits represented the little understood Late Woodland/Early Mississippian transition, one of the few small Middle Mississippian settlements studied to date, and important indications of 19th century life in northeast Arkansas.

An avocational archeologist reported the Zebree site to Dan Morse of the then newly formed AAS in 1967. This site and two others reported at the same time were tested in 1968, and the great importance of the deposits at Zebree was identified (Morse 1968). Extensive excavations in 1969 proved that this site was eligible for placement on the National Register of Historic Places (Anderson 1976). When the Corps of Engineers decided to go ahead with the long planned reexcavation of the ditch beside Zebree, AAS planned major excavations to mitigate the impact on the site. This field work was conducted in 1975. By the time ditching began at Zebree, in July 1976, the Morses were utilizing entirely volunteer labor and heavy equipment time donated by the ditch construction contractor (Anderson 1976).

Voluminous reports have been written as a result of this work (Morse and Morse 1975,1980), and several smaller papers and theses. Anderson (1976) was mentioned above. Sierzchula (1980) wrote a thesis detailing the replication and use of Zebree microliths, which are a link between Zebree and the Early Mississippian culture of the great Cahokia site (see also Morse 1971). Powell (1977) wrote a thesis analyzing the 30 human skeletons from Zebree, and illustrated the usefulness of even small skeletal populations in detailing the lifeways of a people.

Multidisciplinary work during the excavation included the collection and analysis of cores from Big Lake by Dr. Jim King. Dates were obtained from archeomagnetic samples collected by Dr. Dan Wolfman, tree ring samples collected by Lynne Bowers, and radio carbon samples. Site environment was also reflected in the tree rings, as well as the pollen samples analyzed by Dr. Alan Solomon. Preservation of even very small seeds and lots of nut hulls allowed Suzanne Harris to extensively discuss uses of plants at Zebree over time.

These three sites all have stratified middens spanning several thousand years. There is excellent preservation of bone, botanical material, pollen and artifacts. The modern excavations of these sites have contributed extensively to the regional data base and we can expect this to continue in the future.

At present we have only surface collections from 15 sites and only five have had any excavations (3CG1, 3CG636, 3MS593, 23DU5, 3CG713). Seven other sites were plotted from GLO maps and have not been ground verified. Three sites have been reported by amateurs but no artifact collections are known to exist. One cemetery not counted as one of the 30 sites will have to be dealt with.

3CG637

3CG637 was discovered by the St. Francis II project (Klinger and Mathis 1978). The investigators define the site as a very thin scatter of flakes and Barnes and Baytown Plain sherds covering approximately 5000 square meters on a low rise between the west levee of Cockle Burr Slough Ditch and Cane Island Slough Ditch. These disturbances could have affected the site. The site is also cultivated and was freshly disced when discovered, which decreased the visability of artifacts. The investigators picked up all visable artifacts. Although they noted that the site could be on an artificial rise, they did not dig a shovel test in it. This would also have been a more convincing test for the presence of a midden, which they coded as "none apparent". The investigators called the site Late Woodland/Early Mississippian, but the ceramics collected are Late Woodland only (Morse and Morse 1983). In fact, the artifact inventory (Klinger in Klinger and Mathis 1978) lists 11 grit tempered Barnes sherds and 1 grog tempered Baytown sherd, so the site is more strongly in the Barnes tradition, probably Dunklin Phase.

3CG607

"Dr. Varner's", 3CG607, was recorded from a GLO map by Brenda Keech. She later checked the original field notes and found that there was a house and field in a clearing in this area when the section line was surveyed in 1847.

Williams (1930) indicates that Edward Mattix opened the first farm on Buffalo Island. In 1844 he sold it to Dr. Thomas Varner, who was a physician from Georgia. Indians still lived on the Island at this time. Most of this "island" was frequently flooded. One of Dr. Varner's sons, Francis H., retained his father's farm for some period, but it is unclear whether his "good residence and out-buildings ...[including] a cotton-gin and grist-mill" (Goodspeed 1889:360) were located on the original farm. Obviously, they had to be near the St. Francis River. Williams (1930:454) reports that Varner "Bought the cottin gin from his uncle at Kennett and barged the plant down the river."

In summary, the distribution of Prehistoric sites in the St. Francis Seepage Project Area appear to be oriented toward the rich natural levee soils on which the man made levees are constructed. The average site density of 3.1 sites per mile is twice as great as the average for the Big Lake Transect and the Arkansas Power and Light Keo to Dell Transect. It is four times as dense as the site density in the Tyronza Basin Survey. In other words, the site density is one of the highest thus far identified in Arkansas. There is also evidence that some of these sites are extremely well preserved.

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

by

Robert H. Lafferty III

INTRODUCTION

A Literature and records search was conducted on a 93 mile transect of the St. Francis Seepage project in northeast Arkansas and southeast Missouri. The project area involves a 1000 foot impact zone on the banks of the St. Francis River and on the Right Hand Chute of Little River. This resulted in the identification of 30 archeological sites and one cemetery in the project area and another 24 sites within 1000 feet of the impact zone (Chapter 4). These sites range in time from Dalton through late Historic times (Appendix B).

The distribution of the sites across space were analyzed in relationship to soils variables (Chapter 5). While this analysis is not statistically based the results were consistent with other models developed in the St. Francis Basin (Dekin et al 1978; Price and Price 1980; Lafferty et al 1984, 1985). That is, prehistoric sites are found on the levee soils. The prehistoric sites located on slackwater deposited soils consisted of sites located on unmapped patches of better drained soils or isolated finds. The distribution of historic sites appears to be random in terms of biophysical variation. This was also consistent with other attempts to model this class of sites (Lafferty et al 1981, 1984, 1985; Lafferty and House 1985).

The Density of sites in the project area was grossly projected based on the site densities found in the Big Lake Transect (BLT) and the distribution of soils in the project area. This resulted in predicting that there are 290 prehistoric sites in the project area. The distribution of the levee soils suggests that most of these are not in the St. Francis Sunk Lands.

The 1930's quadrangle maps were examined carefully for the presence of historic structures. Seventy-four (74) locations were identified with one or more structures. These are all at locations where roads came up to the levee. The lowest density of historic sites was in the St. Francis Sunk Lands. Many of the roads and structures have been removed from the landscape under the current mechanical agricultural practices.

In summary we predict that there are in the neighborhood of 364 sites in the project area. Thirty of these are currently known and ca. 334 are not yet discovered.

Three sites in or within 1000 feet of the project area have been extensively excavated: Lawhorn, Mangram and Zebree. These sites all had preserved bone, botanicals, features and structures present. While we do not expect every site in the project area to be of this quality we do expect that there are many more in this project area and it is quite possible that many of the smaller sites may have similar excellent preservation.

SITE SIGNIFICANCE

Federal Regulation 36CFR60.4 outlines the qualities which make cultural properties significant and eligible for nomination to the National Register of Historic Places (NRHP). These regulations state:

> <u>National Register criteria for evaluation.</u>
>
> The quality of significance in American history, architecture, archeology, and culture is present in districts, sites, buildings, structures, and objects of State and local importance that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and
>
> (a) That are associated with events that have made a significant contribution to the broad patterns of our history; or
>
> (b) That are associated with the lives of persons significant in our past; or
>
> (c) That embody the distinctive characteristics of a type, period, or method of

> construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
>
> (d) That have yielded, or may be likely to yield, information important in prehistory or history. (Federal Register 1976:1595)

In order for sites to be significant and eligible for NRHP nomination they should have intact deposits and a high degree of integrity of location, setting, feeling and association. While this is not a criterion for significance it is a general precondition defined in the regulations (Federal Register 1976:1595). In some instances it can be waived if intact deposits of a particular study unit (cf. Davis 1982 and Morse 1982 for the specific ones currently recognized in Arkansas; none have yet been defined for Missouri) are not known or known to be almost nonexistent. For example in the Ozarks Sabo et al (1982) explicitly included disturbed assemblages from the Archaic, Mississippian and Woodland periods and virtually any Paleo-Indian/Dalton site as potentially significant suggests just how rare these undisturbed sites are in that region. Other highly disturbed sites which are known to be representative of classes of sites with known undisturbed deposits are likely to be non-significant; however specific arguments might also waive this.

Due to the active alluvial situation present in both parts of the project area we expect that a large number of the sites, even from Mississippian and possibly historic times will contain largely intact deposits. If this project continutes to the field testing stage, an important cost consideration will be the determination and convincing documentation of site redundancy.

The temporal cut off for significance is legally set at more than 50 years old. Again this requirement can be waived if the resource is associated with someone of note or importance, and is otherwise eligible under Criteria a, b or c. The 74 potential sites identified in the project area on the basis of the 1930's quadrangle maps all probably have components more than 50 years old, and it is quite possible that there are some earlier sites which are not represented on these or in the GLO maps. The latter only show cultural features observable from the section line. The St. Francis River was well known by the early French and was a main avenue of approach to the eastern Ozarks. It is probable that there are early historic sites from this period in the project area. The most recent reconstructions place DeSoto's entrada's route through this part of Arkansas along the St. Francis River. It is not likely that evidence of this ephemeral event will be recovered in the project area; however the possibility should not be ignored. Therefore there is a high potential for significant historic sites in the project area. Again, especially for the late historic tenant sites, an important consideration will be determining which sites contain redundant informa-

tion and which do not. There is the probability that sites related to riverine transportation (landing, docks, etc.) and industry will be found which will be unique to the river and important in the history of the region. Particular attention needs to be paid to Cane Island east of Lake City which may have cemeteries in the project area.

For a site to be archeologically significant (Criterion d) it must be shown to have data relevant to current research questions in an archeological region such as the Central Mississippi River Valley (cf. Tainter and Lucas 1983 for comment and extensive reference of this discussion). At the present time, most of the study units which form the basic cultural, chronological and spatial units which are manipulated in more sophisticated processual analysis have not been defined (Chapman 1975, 1980; see discussion of these in Chapter 3). Therefore, chronology construction and assemblage/phase definition are all high priority activities and form relevant research questions for the Archaic and Woodland periods. While such basic work has been done for some of the larger Mississippian sites we presently know very little about the dispersion of smaller Mississippi farmsteads and hamlets nor their relations with the larger centers. Several of these have been identified in or near the project area, and one of the problems of redundancy will be determining which farmsteads are related to which centers in what capacities.

In summary this is probably a regionally significant data base which has already produced a number of significant archeological sites which have made important contributions to our knowledge. The arrangement of the project area down the levees of the rivers places it in the zone which is most likely to have archeological sites and deposits. The estimated site density of 3.9 sites per mile of project is double the average for the BLT and the AP & L Survey, and quadruple what was found in the Tyronza surveys. This density is expectable since the majority of the project area is composed of levee soils. In the Tyronza survey almost 3/4 of the project area was in slackwater deposited soils.

RECOMMENDATIONS

1. Conduct a 100% survey of the project area.

Because of the high density of sites and the random distribution of historic sites in the project area we recommend a 100% survey of the project area as the most cost effective way of defining the resource base in the project area. While it is possible to apply the Tyronza predictive model to the project area it is probable that the mosaic of high probability units and probable historic sites would result in having to survey the whole project area just to get to all of the high probability areas. Furthermore the presence of unmapped soils conducive to prehistoric occupation makes the development of prehistoric models based on the soil maps of questionable value to locate all of the sites in the project area. Predictive models presently

have their greatest managerial utility on large areal projects where large areas can be eliminated on the basis of sample survey. In the case of the St. Francis Seepage project it is our opinion that the site densities are so high and the distributions of levee soils so extensive (though areally restricted in some localities) that the resulting distribution would require at least walking the survey crew across almost all areas of the project area.

2. Develop a predictive model of site size, site type, and phase which will be useful for sorting out classes of sites so redundant ones can be identified. This should be structured so that a prioritized sequence of testing can be carried out and statistical cutoffs embodied so that there will be a statistical basis for knowing when a certain level of redundance is reached.

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APPENDIX A

SCOPE OF WORK

APPENDIX A

Scope of Work

Cultural Resource Literature Search of the St. Francis River Seepage Project within Clay, Craighead, Mississippi and Poinsett Counties, Arkansas and Dunklin County, Missouri.

1. General.

1.01. The Contractor shall conduct a background and literature search of the St. Francis River Area within Clay, Craighead, Mississippi and Poinsett Counties, Arkansas and Dunklin County, Missouri. (See paragraph 2). These tasks are in partial fulfillment of the Memphis District's obligations under the National Historic Preservation Act of 1966 (P.L. 89-665); the National Environment Policy Act of 1969 (P.L. 91-190); Executive Order 11593, "Protection and Enhancement of Cultural Environment," 13 May 1971 (36 F.R. 3921); Preservation of Historic and Archeological Data, 1974 (P.L. 93-291); and the Advisory Council on Historic Preservation, "Procedures for the Protection of Historic and Cultural Properties" (36 CFR VIII Part 800).

1.01. Personnel Standards.

a. The Contractor shall utilize a systematic, interdisciplinary approach to conducting the study. Specialized knowledge and skills will be used during the course of the study to include expertise in archeology, history,

architecture, geology and other disciplines as required. Techniques and methodologies used for the study shall be representative of the state of current professional knowledge and development.

b. The following minimal experiential and academic standards shall apply to personnel involved in cultural resources investigations described in this Scope of Work:

(1) Archeological Project Directors or Principal Investigators (PI). Persons in charge of an archeological project or research investigation contract, in addition to meeting the appropriate standards for archeologist, must have a publication record that demonstrates extensive experience in field project formulation, execution and technical monograph reporting. Suitable professional references may also be made available to obtain estimates regarding the adequacy of prior work. If prior projects were of a sort not ordinarily resulting in a publishable report, a narrative should be included detailing the proposed project director's previous experience along with references suitable to obtain opinions regarding the adequacy of this earlier work.

(2) Archeologist. The minimum formal qualifications for individuals practicing archeology as a profession are a B.A. or B.S. degree from an accredited college or university, followed by a 2 years of graduate study with concentration in anthropology and specialization in archeology and at least two summer field schools or their equivalent under the supervision of

archeologists of recognized competence. A Master's thesis or its equivalent in research and publication is highly recommended, as is the M.A. degree.

(3) Other Professional Personnel. All non-archeological personnel utilized for their special knowledge and expertise must have a B.A. or B.S. degree from an accredited college or university, followed by a minimum of the year of successful graduate study with concentration in appropriate study.

(4) Other Supervisory Personnel. Persons in any archeological supervisory position must hold a B.A., B.S. or M.A. degree with a concentration in archeology and a minimum of 2 years of field and laboratory experience.

(5) Crew Members and Lab Workers. All crew members and lab workers must have prior experience compatible with the tasks to be performed under this contract. An academic background in the appropriate field of study is highly recommended.

c. All operations shall be conducted under the supervision of qualified professionals in the discipline appropriate to the data that is to be discovered, described or analyzed. Vitae of personnel involved in project activities may be required by the Contracting Officer at anytime during the period of service of this purchase order.

1.03. The Contractor shall designate in writing the name or names of the Principal Investigator. In the event of controversy or court challenge, the Principal Investigator shall testify with respect to report findings.

1.04. The Contractor shall keep standard records which may be reviewed by the Contracting Officer. These records shall include field notes, site survey forms and any other cultural resource forms and/or records, field maps and photographs necessary to successfully implement requirements of this Scope of Work.

1.05. To conduct the field investigation, the Contractor will obtain all necessary permits, licenses; and approvals from all local, state and Federal authorities. Should it become necessary in the performance of the work and services of the Contractor to secure the right of ingress and egress to perform any of the work required herein on properties not owned or controlled by the Government, the Contractor shall secure the consent of the owner, his representative, or agent, prior to effecting entry on such property.

1.06. Innovative approaches to data location, collection, description and analysis, consistent with other provisions of contract and the cultural resources requirements of the Memphis District, are encouraged.

1.07. The Contractor shall furnish expert personnel to attend conferences and furnish testimony in any judicial proceedings involving the archeological and historical study, evaluation, analysis and report. When required, arrangements for these services and payment, therefore, will be made by

representatives of either the Corps of Engineers or the Department of Justice.

1.08. The Contractor, prior to the acceptance of the final report, shall not release any sketch, photograph, report or other material of any nature obtained or prepared under this contract without specific written approval of the Contracting Officer.

1.09. The extent and character of the work to be accomplished by the Contractor shall be subject to the general supervision, direction, control and approval of the Contracting Officer. The Contracting Officer may have a representative of the Government present during any or all phases of the described cultural resource project.

2. Study Area.

2.01. The St. Francis River Seepage Project is located in Clay, Craighead, Poinsett and Mississippi Counties, Arkansas, and Dunklin County, Missouri. The right-of-way extends 1000 feet landward of the levee center line. Measured from the levee on the same side as the proposed right-of-way. The locations of the study are as follows:

Descending Side of Bank	Quadrangle Map	Township	Range	Section -	Portion	County	State
Left	Piggott, AR-MO	20 N	9E	3 -	E 1/2	Clay	AR
Left	Piggott, AR-MO	20 N	9E	10 -	E 1/2	Clay	AR
Left	Piggott, AR-MO	20 N	9E	15 -	E 1/2	Clay	AR
Left	Piggott, AR-MO	20 N	9E	22 -	E 1/2	Clay	AR
Left	Piggott, AR-MO	20 N	9E	27 -	E 1/2	Clay	AR
Left	Piggott, AR-MO	20 N	9E	34 -	E 1/2	Clay	AR
Left	Piggott, AR-MO	19 N	9E	2 -	E 1/2 & NW 1/4	Clay	AR
Left	Piggott, AR-MO	19 N	9E	11 -	SW 1/4 & NE 1/4	Clay	AR
Left	Piggott, AR-MO	19 N	9E	15 -	S 1/2 & NE 1/4	Clay	AR
Left	Piggott, AR-MO	19 N	9E	21 -	SW 1/4 & NE 1/4	Clay	AR
Left	Piggott, AR-MO	19 N	9E	20 -	SE 1/4 of SE 1/4	Clay	AR
Left	Piggott, AR-MO	19 N	9E	29 -	E 1/2	Clay	AR
Left	Kennett, AR-MO	19 N	8E	32 -	All	Clay	AR
Left	Kennett, AR-MO	18 N	8E	6 -	Center	Clay	AR
Left	Kennett, AR-MO	18 N	8E	1 -	SE 1/4 of SE 1/4	Clay	AR
Left	Kennett, AR-MO	18 N	8E	12 -	NW 1/4	Clay	AR
Left	Kennett, AR-MO	18 N	8E	11 -	Center	Clay	AR
Right	Kennett, AR-MO	19 N	9E	32 -	W 1/2	Dunklin	MO
Right	Kennett, AR-MO	18 N	9E	5 -	NW 1/4	Dunklin	MO
Right	Kennett, AR-MO	18 N	9E	6 -	SE 1/4	Dunklin	MO
Right	Kennett, AR-MO	18 N	9E	7 -	NW 1/4	Dunklin	MO
Right	Kennett, AR-MO	18 N	8E	12 -	NW 1/4	Dunklin	MO
Right	Kennett, AR-MO	18 N	8E	13 -	NW 1/4 of NW 1/4	Dunklin	MO
Right	Kennett, AR-MO	18 N	8E	15→ ~~14~~ -	S½→ NW 1/2	Dunklin	MO
Right	Kennett, AR-MO	18 N	8E	21→ ~~22~~ -	NW 1/4	Dunklin	MO
Right	Kennett, AR-MO	18 N	8E	28 -	E½→ NW 1/2	Dunklin	MO
Right	Kennett, AR-MO	18 N	8E	33 -	NW 1/4 of NW 1/4	Dunklin	MO
Right	Kennett, AR-MO	18 N	8E	32 -	NW 1/2	Dunklin	MO
Right	Kennett, AR-MO	17 N	8E	5 -	NW 1/4	Dunklin	MO
Right	Kennett, AR-MO	17 N	8E	6 -	SE 1/4	Dunklin	MO
Right	Kennett, AR-MO	17 N	8E	7 -	NW 1/4	Dunklin	MO
Right	Marmaduke, AR-MO	17 N	7E	22 -	SE 1/2	Dunklin	MO
Right	Marmaduke, AR-MO	17 N	7E	27 -	NW 1/4	Dunklin	MO
Right	Marmaduke, AR-MO	17 N	7E	28 -	SE 1/4	Dunklin	MO
Right	Marmaduke, AR-MO	17 N	7E	33 -	SW 1/4	Dunklin	MO
Right	Marmaduke, AR-MO	17 N	7E	32 -	SE 1/4	Dunklin	MO
Right	Marmaduke, AR-MO	16 N	7E	5 -	NW 1/4	Dunklin	MO
Right	Marmaduke, AR-MO	16 N	7E	7→ ~~8~~ -	E½→ ~~NW 1/4~~	Dunklin	MO
Right	Marmaduke, AR-MO	16 N	7E	~~18~~ -	~~E 1/2~~	Dunklin	MO
Right	Marmaduke, AR-MO	16 N	7~~6~~E	17→ ~~19~~ -	W½→ ~~NW 1/2~~	Dunklin	MO
Right	Leachville, AR-MO	16 N	6E	24→ ~~25~~ -	SE¼→ ~~NW 1/2~~	Dunklin	MO
Right	Leachville, AR-MO	16 N	7E	20 -	NW 1/2	Craighead	AR
Right	Leachville, AR-MO	16 N	7E	29 -	W 1/2	Craighead	AR
Right	Leachville, AR-MO	16 N	7E	32 -	W 1/2	Craighead	AR
Right	Leachville, AR-MO	15 N	7E	5 -	W 1/2	Craighead	AR
Right	Leachville, AR-MO	15 N	7E	8 -	W 1/2	Craighead	AR
Right	Leachville, AR-MO	15 N	7E	18 -	NW 1/4	Craighead	AR
Right	Leachville, AR-MO	15 N	7E	13 -	SE 1/4	Craighead	AR

Descending Side of Bank	Quadrangle Map	Township	Range	Section -	Portion	County	State
Right	Leachville, AR-MO	15 N	7E	24 -	NW 1/2	Craighead	AR
Right	Leachville, AR-MO	15 N	7E	25 -	NW 1/4 of NW 1/4	Craighead	AR
Right	Leachville, AR-MO	15 N	7E	26 -	SE 1/2	Craighead	AR
Right	Leachville, AR-MO	15 N	7E	35 -	W 1/2	Craighead	AR
Right	Leachville, AR-MO	14 N	7E	2 -	W 1/2	Craighead	AR
Right	Leachville, AR-MO	14 N	7E	10 -	E 1/2	Craighead	AR
Right	Leachville, AR-MO	14 N	7E	15 -	E 1/2	Craighead	AR
Right	Leachville, AR-MO	14 N	7E	23 -	N 1/2	Craighead	AR
Right	Leachville, AR-MO	14 N	7E	24 -	SW 1/4 of SW 1/4	Craighead	AR
Right	Leachville, AR-MO	14 N	7E	25 -	NE 1/2	Craighead	AR
Right	Leachville, AR-MO	14 N	7E	31 -	W 1/2	Craighead	AR
Right	Leachville, AR-MO	13 N	7E	6 -	W 1/2	Craighead	AR
Right	Leachville, AR-MO	13 N	7E	7 -	W 1/2	Craighead	AR
Right	Leachville, AR-MO	13 N	7E	18 -	W 1/2	Craighead	AR
Right	Marked Tree, AR	13 N	7E	19 -	W 1/2	Craighead	AR
Right	Marked Tree, AR	13 N	7E	30 -	W 1/2	Craighead	AR
Right	Marked Tree, AR	13 N	7E	31 -	W 1/2	Craighead	AR
Right	Marked Tree, AR	12 N	7E	1 -	E 1/2	Poinsett	AR
Right	Marked Tree, AR	12 N	6E	12 -	E 1/2	Poinsett	AR
Right	Marked Tree, AR	12 N	6E	13 -	E 1/2	Poinsett	AR
Left	Manila, AR-MO	16 N	6E	21 -	E 1/2	Mississippi	AR
Left	Manila, AR-MO	16 N	9E	28 -	NW 1/4	Mississippi	AR
Left	Manila, AR-MO	16 N	9E	32 -	E 1/2	Mississippi	AR
Left	Manila, AR-MO	15 N	9E	5 -	E 1/2	Mississippi	AR
Left	Manila, AR-MO	15 N	9E	8 -	E 1/2	Mississippi	AR
Left	Manila, AR-MO	15 N	9E	17 -	E 1/2	Mississippi	AR
Left	Manila, AR-MO	15 N	9E	21 -	W 1/2	Mississippi	AR
Left	Manila, AR-MO	15 N	9E	28 -	W 1/2	Mississippi	AR
Left	Manila, AR-MO	15 N	9E	33 -	W 1/2	Mississippi	AR
Left	Manila, AR-MO	14 N	9E	4 -	W 1/2	Mississippi	AR
Left	Manila, AR-MO	14 N	9E	9 -	W 1/2	Mississippi	AR
Left	Manila, AR-MO	14 N	9E	16 -	NW 1/4 of NW 1/4	Mississippi	AR
Left	Manila, AR-MO	14 N	9E	17 -	E 1/2	Mississippi	AR
Left	Manila, AR-MO	14 N	9E	20 -	N-S Center	Mississippi	AR
Left	Manila, AR-MO	14 N	9E	29 -	W 1/2	Mississippi	AR
Left	Manila, AR-MO	14 N	9E	31 -	NW 1/4	Mississippi	AR
Left	Manila, AR-MO	14 N	8E	36 -	SE 1/4	Mississippi	AR
Left	Manila, AR-MO	13 N	8E	2 -	N 1/2	Mississippi	AR
Left	Manila, AR-MO	13 N	8E	3 -	S 1/2	Mississippi	AR
Left	Manila, AR-MO	13 N	8E	4 -	NE 1/4	Mississippi	AR
Left	Manila, AR-MO	13 N	8E	9 -	NW 1/4	Mississippi	AR

END OF PROJECT

3. Definitions.

3.01. "Cultural resources" are defined to include any building, site, district, structure, object, data, or other material relating to the history, architecture, archeology, or culture of an area.

3.02. "Background and Literature Search" is defined as a comprehensive examination of existing literature and records for the purpose of inferring the potential presence and character of cultural resources in the study area. The examination may also serve as collateral information to field data in evaluating the eligibility of cultural resources for inclusion in the National Register of Historic Places or in ameliorating losses of significant data in such resources.

3.03. "Intensive Survey" is defined as a comprehensive, systematic, and detailed on-the-ground survey of an area, of sufficient intensity to determine the number, types, extent and distribution of cultural resources present and their relationship to project features.

3.04. "Mitigation" is defined as the amelioration of losses of significant prehistoric, historic, or architectural resources which will be accomplished through preplanned actions to avoid, preserve, protect, or minimize adverse effect upon such resources or to recover a representative sample of the data they contain by implementation of scientific research and other professional techniques and procedures. Mitigation of losses of cultural

resources includes, but is not limited to, such measures as: (1) recovery and preservation of an adequate sample of archeological data to allow for analysis and published interpretation of the cultural and environmental conditions prevailing at the time(s) the area was utilized by man; (2) recording, through architectural quality photographs and/or measured drawings of buildings, structures, districts, sites and objects and deposition of such documentation in the Library of Congress as a part of the National Architectural and Engineering Record; (3) relocation of buildings, structures and objects; (4) modification of plans or authorized projects to provide for preservation of resources in place; (5) reduction or elimination of impacts by engineering solutions to avoid mechanical effects of wave wash, scour, sedimentation and related processes and the effects of saturation.

3.05. "Reconnaissance" is defined as an on-the-ground examination of selected portions of the study area, and related analysis adequate to assess the general nature of resources in the overall study area and the probable impact on resources of alternate plans under consideration. Normally reconnaissance will involve the intensive examination of not more than 15 percent of the total proposed impact area.

3.06. "Significance" is attributable to those cultural resources of historical, architectural, or archeological value when such properties are included in or have been determined by the Secretary of the Interior to be eligible for inclusion in the National Register of Historic Places after evaluation against the criteria contained in 36 CFR 63.

3.07. "Testing" is defined as the systematic removal of the scientific, prehistoric, historic, and/or archeological data that provide an archeological or architectural property with its research or data value. Testing may include controlled surface survey, shovel testing, profiling, and limited subsurface test excavations of the properties to be affected for purposes of research planning, the development of specific plans for research activities, excavation, preparation of notes and records, and other forms of physical removal of data and the material analysis of such data and material, preparation of reports on such data and material and dissemination of reports and other products of the research. Subsurface testing shall not proceed to the level of mitigation.

3.08. "Analysis" is the systematic examination of material data, environmental data, ethnographic data, written records, or other data which may be prerequisite to adequately evaluating those qualities of cultural loci which contribute to their significance.

4. General Performance Specifications.

4.01. The Contractor shall prepare for the project area a draft and final report detailing the results of the study and subsequent recommendations.

4.02. Background and Literature Search.

a. This task shall include an examination of the historic and prehistoric environmental setting and cultural background of the study area and shall be

of sufficient magnitude to achieve a detailed understanding of the overall cultural and environmental context of the study area.

b. Information and data for the literature search shall be obtained, as appropriate, from the following sources: (1) Scholarly reports - books, journals, theses, dissertations and unpublished papers; (2) Official Records - Federal, state, county and local levels, property deeds, public works and other regulatory department records and maps; (3) Libraries and Museums - both regional and local libraries, historical societies, universities, and museums; (4) Other repositories - such as private collections, papers, photographs, etc.; (5) archeological site files at local universities, the State Historic Preservation Office, the office of the State Archeologist; (6) Consultation with qualified professionals familiar with the cultural resources in the area, as well as consultation with professionals in associated areas such as history, sedimentology, geomorphology, agronomy, and ethnology.

c. The Contractor shall include as an appendix to the drafts and final reports written evidence of all consultation and any subsequent responses(s), including the dates of such consultation and communications.

d. The background and literature search shall be performed in such a manner as to facilitate predictive statements (to be included in the study report) concerning the probable quantity, character, and distribution of cultural resources within the project area. In addition, information obtained in the background and literature search should be of such scope and detail as to serve as an adequate data base for subsequent field work and analysis in the

study area undertaken for the purpose of discerning the character, distribution and significance of specific identified cultural resources.

e. In order to accomplish the objectives described in paragraph 4.02.d., it will be necessary to attempt to establish a relationship between landforms and the patterns of their utilization by successive groups of human inhabitants. This task should involve defining and describing various zones of the study area with specific reference to such variables as past topography, potential food resources, soils, geology, and river channel history.

C-5. General Report Requirements.

5.01. The primary purpose of the cultural resources report is to serve as a planning tool which aids the Government in meeting its obligations to preserve and protect our cultural heritage. The report will be in the form of a comprehensive, scholarly document that not only fulfills mandated legal requirements but also serves as a scientific reference for future cultural resources studies. As such, the report's content must be not only descriptive but also analytic in nature.

5.02. Upon completion of all research, the Contractor shall prepare reports detailing the work accomplished, the results.

5.03. The report shall include, but not necessarily be limited to, the following sections and items:

a. Title Page. The title page should provide the following information; the type of task undertaken, the cultural resources which were assessed (archeological, historical, architectural); the project name and location (county and state), the date of the report; the Contractor's name; the purchase order number; the name of the author(s) and/or the Principal Investigator; and the agency for which the report is being prepared.

b. Abstract. The abstract should include a summary of the number and types of resources which were surveyed, results of activities and the recommendations of the Principal Investigator.

c. Table of Contents.

d. Introduction. This section shall include the purpose of the report, a description of the proposed project, a map of the general area, a project map; and the dates during which the task was conducted. The introduction shall also contain the name of the institution where recovered materials will be curated.

e. Environmental Context. This section shall contain, but not be limited to, a discussion of probable past floral and faunal characteristics of the project area. Since data in this section will be used in the evaluation of specific cultural resource significance, it is imperative that the quantity and quality of environmental data be sufficient to allow subsequent detailed analysis of the relationship between past cultural activities and environmental variables.

f. Previous Research. This section shall describe previous research which may be useful in deriving or interpreting relevant background research data, problem domains, or research questions and in providing a context in which to examine the probability of occurrence and significance of cultural resources in the study area.

g. Literature Search and Personal Interviews. This section shall discuss the results of the literature search, including specific data sources, and personal interviews which were conducted during the course of investigations.

h. Conclusions and Recommendations. This section shall contain the recommendations of the Principal Investigator regarding all contract activities. Conclusions derived from records search concerning the nature, quantity and distribution of cultural loci, should be used in describing the probably impact of project alternatives on cultural resources. Conclusions and recommendations should include an evaluation of predictive statements formulated on the basis of the background and literature search.

i. References (American Antiquity style).

j. Appendices (maps, correspondence, etc.). A copy of this Scope of Work shall be included as an appendix in all reports.

5.04. The above items do not necessarily have to be discrete sections; however, they should be readily discernible to the reader. The detail of the above items may vary somewhat with the purpose and nature of the study.

5.05. In order to prevent potential damage to cultural resources, no information shall appear in the body of the report which would reveal precise resource location. All maps which indicate or imply precise site locations shall be included in reports as a readily removable appendix (ex: envelope).

5.06. No logo or other such organizational designation shall appear in any part of the report (including tables or figures) other than the title page.

5.07. Unless otherwise specifically authorized by the Contracting Officer, all reports shall utilize permanent site numbers assigned by the state in which the study occurs.

5.08. All appropriate information (including typologies and other classificatory units) not generated in these contract activities shall be suitably referenced.

5.09. Information shall be presented in textual, tabular, and graphic forms, whichever are most appropriate, effective and advantageous to communicate necessary information. All tables, figures and maps appearing in the report shall be of publishable quality.

5.10. Any abbreviated phrases used in the text shall be spelled out when the phase first occurs in the text. For example use "State Historic Preservation Officer (SHPO)" in the initial reference and thereafter "SHPO" may be used.

5.11. The first time the common name of a biological species is used it should be followed by the scientific name.

5.12. In addition to street addresses or property names, sites shall be located on the Universal Transverse Mercator (UTM) grid.

5.13. All measurements should be metric. If the Contractor's equipment is in the English system, then the metric equivalents should follow in parentheses.

5.14. As appropriate, diagnostic and/or unique artifacts, cultural resources or their contexts shall be shown by drawings or photographs.

5.15. Black and white photographs are preferred except when color changes are important for understanding the data being presented. No instant type photographs may be used.

5.16. Negatives of all black and white photographs and/or color slides of all plates included in the final report shall be submitted.

6. <u>Submittals</u>.

6.01. The Contractor shall, unless delayed due to causes beyond his fault or negligence, complete all work and services under the purchase order within the following time limitations after receipt of notice to proceed.

a. Four (4) copies of the draft report will be submitted within 40 calendar days following receipt of notice to proceed.

b. The Contractor shall submit under separate cover, three copies of appropriate 15' quadrangle maps (7.5' when available) or other site drawings which show exact boundaries of all cultural resources within the project area and their relationship to project features, and single copies of all forms, records and photographs described in paragraph 1.04.

c. The Government shall review the draft report and provide comments to the Contractor within 30 calendar days after receipt of the draft report. More than one review and revision of the draft report may be required.

d. An unbound original and 25 copies of the final report shall be submitted within 30 calendar days following the Contractor's receipt of the Government's comments on the draft report.

6.02. If the Government review exceeds 30 calendar days, the period of service of the purchase order shall be extended on a day-by-day basis equal to any additional time required by the Government for review.

a. All maps which indicate or imply actual site locations shall be included in reports as a readily removable appendix (ex: envelope). In order to prevent potential damage to cultural resources, no information shall appear in the body of the report which would suggest resource location.

b. No logo or other such organizational designation shall appear in any part of the report (including tables or figures) other than the title page.

6.03. At any time during the period of service of this purchase order, upon the written request of the Contracting Officer, the Contractor shall submit, within 30 calendar days, any portion or all field records described in paragraph 1.04 without additional cost to the Government.

C-7. SCHEDULE.

7.01. The Contractor shall, unless delayed due to causes beyond his control and without his fault or negligence, complete all work and services under this purchase order within the following time limitations.

Activity	Due Date (Beginning with acknowledged date receipt of notice to proceed) 7/15/85	
Begin literature search	5 calendar days	
Submittal of Draft Report	45 calendar days	
Government Review of Draft Report	75 calendar days	
Submittal of Final Report	105 calendar days	[illegible]

The Contractor shall, unless delayed due to causes beyond his control and without his fault or negligence, complete all work and services under this purchase order within 105 days after receipt of notice to proceed.

8. Method of Payment.

8.01. Upon satisfactory completion of work by the Contractor, in accordance with the provisions of the purchase order, and its acceptance by the Contracting Officer, the Contractor will be paid the amount of money indicated in Block 25 of the purchase order.

8.02. If the Contractor's work is found to be unsatisfactory and if it is determined that fault or negligence on the part of the Contractor of his employees has caused the unsatisfactory condition, the Contractor will be liable for all costs in connection with correcting the unsatisfactory work. The work may be performed by Government forces or Contractor forces at the direction of the Contracting Officer. In any event, the Contractor will be held responsible for all costs required for correction of the unsatisfactory work, including payments for services, automotive expenses, equipment rental, supervision, and any other costs in connection therewith, where such unsatisfactory work as deemed by the Contracting Officer to be the result of carelessness, incompetent performance or negligence by the Contractor's employees. The Contractor will not be held liable for any work or type of work not covered by this purchase order.

8.03. Prior to settlement upon termination of the purchase order, and as a condition precedent thereto, the Contractor shall execute and deliver to the Contracting Officer a release of all claims against the Government arising under or by virtue of the purchase order, other than such claims, if any, as may be specifically excepted by the Contractor from the operation of the release in state amounts to be set forth therein.

APPENDIX B

SITES IN AND NEAR THE PROJECT AREA

APPENDIX B

SUMMARY OF KNOWN ARCHEOLOGICAL SITES IN THE PROJECT AREA

Table B-1. Sites Partially or Entirely in Project Area

Site Number (Name)	Nature of site	Investigations	Environment	Time Period
3CG1 (9-O-4) (Lawhorn)	PV	SC & EX	HL	W & M
3CG494 (Gibson Farm 1)	PV	AA, SC	GL	W & M
3CG500 (McFarlin)	PVT	AA, SC	HL	A, W, M, H
3CG553	PH	SC	LL	H
3CG554	PI	SC	SW	M
3CG555	PH	SC	LL	H
3CG557	PLD	SC	HL	W
3CG607 (Dr. Varner's)	IH	GLO	GL	H
3CG614 (Field)	IH	GLO	HL, SW	H
3CG615 (Field)	IH	GLO	GL,	H
3CG616 (Field)	IH	GLO	LL	H
3CG636 (Mangrum)	PV	SC & EX LH	HL	W, M,
3CG713	PLD	SC & TE	SW	W, M, H
3MS21 (Lee Richardson)	PVM	AA, SC	LL	W? M?
3MS43 (McQuirter)	PV	AA, SC	LL	W, M

Table B-1 continued. Sites Partially or Entirely in the Project Area

Site Number (Name)	Nature of site	Investigations	Environment	Time Period
3MS49	PV	AA	LL	M
3MS593 (South Big Lake)	PV	AA, SC TE	LL SW (GL)	W, M, H
3MS119 (Rouse)	PV	AA, SC	LL	W, M, LH
3MS133	PLD	SC	LL	W
3MS135	PLD	SC	LL	W, H
3MS136 (Field Union?Mill)	IH	GLO, SC	LL	H
3MS199 (Bronham's Field)	IH	GLO	LL	H
3MS211 (Field)	IH	GLO	LL	H
3MS212 (Field)	IH	GLO	LL	H
3MS318	PT	SC	LL	LH
23DU5 (8-P-1) (Old Varney River)	PV	SC, TE	GL	W, M
23DU12	PVM	AA, SC	GL	W, M
23DU13 (8-O-2) (Wilkins Island Site)	PV	SC	GL	W, M
23DU28	PV	AA	GL	W
23DU50 (T-90)	PV	AA	HL	W?, M?
Cochran (or Cockrum) Cemetery			GL	H

Table B-2. Sites up to 1000 feet outside of the Project Area on the same side of the Levee

Site Number (Name)	Nature of site	Investigations	Environment	Time Period
3CG318	PLD	AA	LL	M
3CG495 (Gibson Farm 2)	PV	AA, SC	GL 60% SW 40% (BL)	W, M
3CG496 (Gibson Farm 3)	PLD	AA, SC	SW	W
3CL497	PLD	AA	SW (BL)	W
3CG556	PI	SC	SW	H
3CG903	PV	AA, SC	HL	A, W, M, LH
3MS45 (McWilliams)	PV	AA, SC	LL	W, MS
3MS125 (Windmill Site #2)	PV	SC	LL	W
3MS128 (Pasley Site)	PVH	SC	LL	M, H
3MS129	PLD	SC	LL	W
3MS131	PT		LL	LH
3MS132	PT		LL	LH
3MS134	PT	SC	LL	LH
3MS197 (House)	IH	BLD	LL	H
23DU2 (8-P-2) (Kennett site)	PVM	SC	GL	W, M

Table B-3. Sites Immediately on the other side of Levee from the Project Area

Site Number (Name)	Nature of site	Investigations	Environment	Time Period
3CG28 (Frasure)	IVM	AA Pottery	SW	W?, M? (mounds)
3CG317 (Jackson Landing)	PLD	AA, SC	SW	?
3CG637	PLD	SC	SW (BL)	W
3MS19 (Buckeye Landing)	PV	AA, SC, TE	LL	M
3MS20 (Zebree)	PV	AA, SC, EX	LL	W, M, H
3MS25 (Manila School Dist) (Cottonwood Point)	PV	BLD, SC, EX	LL	M, H
3MS87	PV	AA	SW (BL)	LA
3MS208	PV	SC	LL	W, M
23DU14 (8-0-3)	PV		BL	W

APPENDIX B

KEY

Nature of Site:

I=Isolated Find
T=Miscellaneous Historic Trash
V=Larger Prehistoric settlement or occuppied over a longer time period
H=Historic House
LD=Low density prehistoric habitation
M=Large prehistoric village with mounds

Investigations:

AA=Avocational Archeologist reported site
GLO=on a General Land Office Map
SC=surface collection made and curated
TE=controlled test excavation made
EX=extensive excavations have been conducted at the site

Environment:

unbracketed=according to soil map;
bracketed= according to site form

Prefix:
P=Precisely located on map
I=Imprecisely located on map

HL=Higher Levee Soils	LL=Lower Levee Soils
GL=General Levee Soils	Sw=Slackwater Soils

Time Periods represented at site:

A=Archaic	Prefixes:
W=Woodland	E=Early
M=Mississippian	M=Middle
H=Historic	L=Late
